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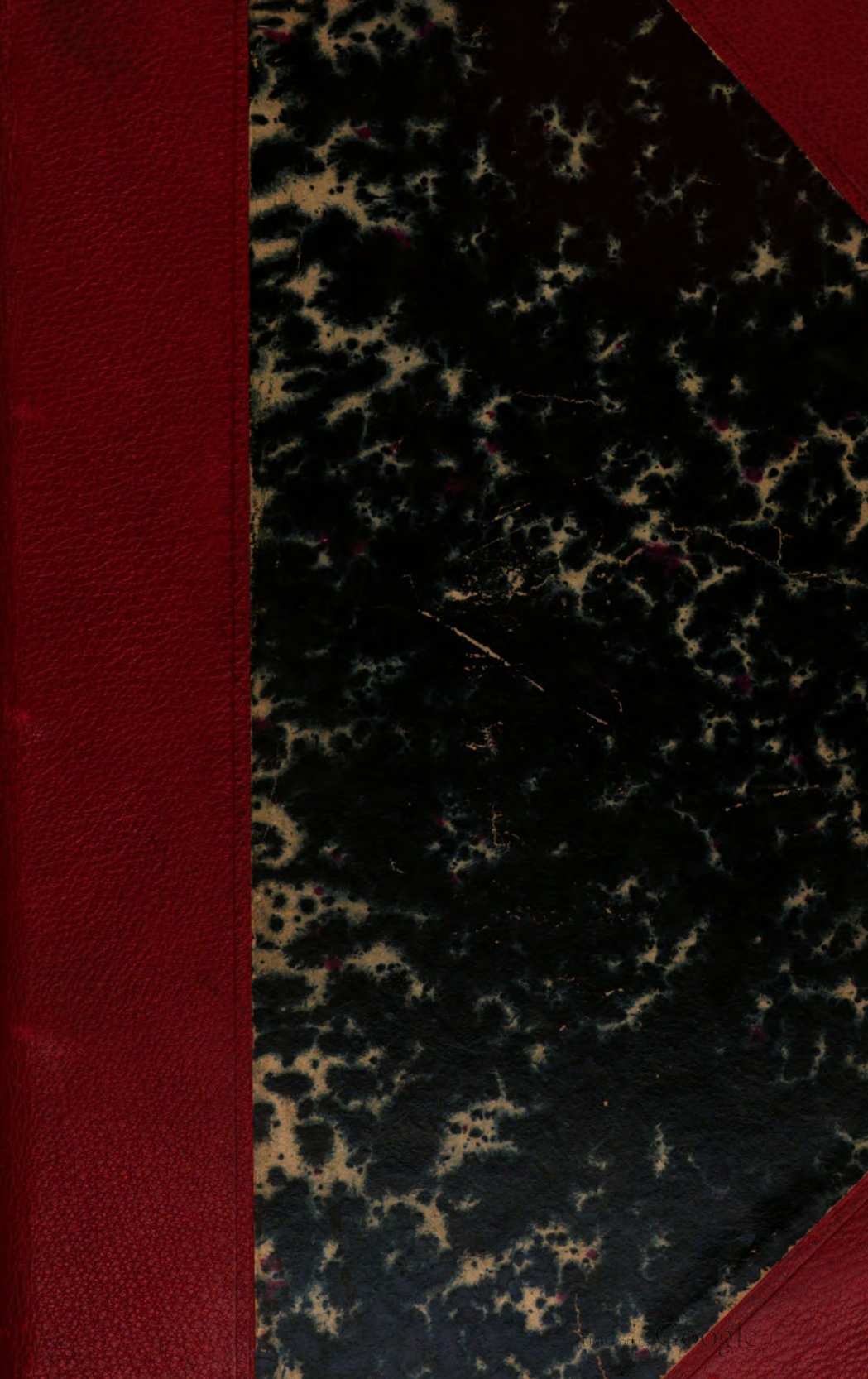

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CONTENTS.

LEADING ARTICLES.

Statistics of College and Non-College Women. *By Mary Roberts Smith.* 1
The Comparative Accuracy of Different Forms of Quinquennial Age Groups. *By Allyn A. Young.* 27
Aids in the Use of Government Publications. *By Lucius Page Lane.* 40
The Registration Laws in the Colonies of Massachusetts Bay and New Plymouth. *By Robert René Kuczynski.* 65
Tramps and Wayfarers. 74
Advertising in the United States. *By Sidney A. Sherman.* 120
The Practical Use of Vital Statistics. *By Frederick L. Hoffman.* 163
Industrial Consolidations in the United States. *By Luther Conant, Jr.* 207
The Enumeration of Children. *By Allyn A. Young.* 227
Some Statistics of Recidivism Among Misdemeants in Boston. *By John Koren.* 271
The Statistical Work of Süssmilch. *By Frederick S. Crum.* 335
Permanent Census Office. 381

REVIEWS AND MISCELLANY.

Argentine Statistics. *F. S. Crum.* 109
Army, Vital Statistics of. 185
Berlin, Statistics of. *S. W. A.* 332
Boards of Trade. 114

Digitized by Google

Boston, Municipal Growth of. 464
" Statistics Department, Bulletin. *E. H. D.* 94, 259
Bureau of Economic Research. *E. H. D.* 183
Census Bulletins. 113
" of Cuba. *D. R. D.* 101
" of Hawaii. 198
" Taking, English. *E. H. D.* 102
Censuses, Notes on Foreign. *C.-E. A. Winslow.* 442
Classification of Causes of Death. *C.-E. A. Winslow.* 176
Congressional Documents, Early. *L. P. L.* 466
Cost of Home-Cooked and Purchased Foods. *Ava M. Stoddard.* 461
Cuba, Race Problems in 85
Danish Labor Statistics. *A. G. Keller.* 62
Death, Classification of Causes of. 176
" at Different Ages. *C.-E. A. Winslow.* 165
Diseases, The Fatality of Certain. 60
" Statistics of. *C.-E. A. Winslow.* 452
Economic Statistics. *E. H. D.* 262
Education of Women. *Alice Upton Pearmain.* 89
Employer's Liability. *Miles Menander Dawson.* 180
English Census Taking. 102
Food, Cost of. 461
Government Annuals and Periodicals. *L. P. Lane.* 334
Gunshot Wounds of 1898 and 1899, General Remarks on. . 115
Hawaii, Census of. 198
Health of Women. *Mary Roberts Smith.* 255
Health of Women, Functional. *Mary Roberts Smith.* 255
Housing Accommodation, Statistics of. 203
Institutions, Statistics of. *C.-E. A. Winslow.* 99
International Statistics. *E. H. D.* 107
Italian Immigration. *E. H. D.* 105
Labor Statistics, Danish. *A. G. Keller.* 62
" Bureaus, Bulletins of. 111
Massachusetts, Pauper Abstract of. *C.-E. A. Winslow.* . . . 50
" The Fifty-eighth Registration Report of. *C.-E. A. Winslow.* 310
Michigan, Vital Statistics of. 197

Digitized by Google

Municipal Growth, A Study of. *F. S. Crum.* 464
Notes. 464
Pauperism, Statistics of. 264
Physicians, Ratio of, to the Population. 266
Race Problems in Cuba. *William Z. Ripley.* 85
Rhode Island, School Attendance in. 199
Round Numbers. *C.-E. A. Winslow.* 59
School Attendance in Rhode Island. 199
Trade, Boards of. 114
" Statistics, Inaccuracy of. 205
Vital Statistics of the Army. *C.-E. A. W.* 185
" " of Michigan. *S. W. A.* 197
" " Notes on. *C.-E. A. Winslow.* 187, 314
" " of American Cities. *C.-E. A. Winslow.* . . . 449

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QUARTERLY PUBLICATIONS OF THE

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I. STATISTICS OF COLLEGE AND NON-COLLEGE WOMEN. By Mary Roberts Smith, Ph.D.

II. THE COMPARATIVE ACCURACY OF DIFFERENT FORMS OF QUINQUENNIAL AGE GROUPS. By Allyn A. Young.

III. AIDS IN THE USE OF GOVERNMENT PUBLICATIONS. By Lucius Page Lane, S.B., A.M.

IV. MISCELLANY AND NOTICES: The Pauper Abstract of Massachusetts, *C.-E. A. Winslow;* Round Numbers, *C.-E. A. Winslow;* The Fatality of Certain Diseases; Danish Labor Statistics, *A. G. Keller.*

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CONTENTS.

I. Statistics of College and Non-College Women. *By Mary Roberts Smith, Ph.D.* 1

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III. Aids in the Use of Government Publications. *By Lucius Page Lane, S.B., A.M.* 40

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Round Numbers. *C.-E. A. Winslow.* 59

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AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, Nos. 49, 50. MARCH, JUNE, 1900.

STATISTICS OF COLLEGE AND NON-COLLEGE WOMEN.

By Mary Roberts Smith, Ph.D.,

Associate Professor of Sociology in Leland Stanford Jr. University.

The oldest women college graduates are now about 65 years of age; until 1880, however, women did not go to college in any considerable numbers. Time enough has only just elapsed, therefore, to make statistics of marriage and child bearing possible. An acquaintance with several thousand college women and their families, and a residence in five colleges of different types, extending over a period of thirty years, has given the writer an opportunity of hearing all phases of women's education discussed. It can scarcely have failed to give a background for the interpretation of statistics bearing upon the comparative results of the generally prevalent systems of education for women. The following data have been collected, with the approval of the Association of Collegiate Alumnæ, a body of over 2000 women, of whom more than 600 are married. The inquiry has not been limited exclusively to them, but includes women graduates of other colleges than those admitted to membership. Heretofore the college women have been compared with that vague standard, the "average" women of the Census;

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it is just to compare them only with women of the same social class, and of approximately the same age, who have been educated in other ways. For the controversy is no longer as to *whether* a woman shall be educated, but as to *how* she shall be educated.

The object of this paper is to show, so far as can be shown by the statistical method, whether college women differ as to age of marriage, child-bearing capacity, health, income, and the class of men they marry, from their sisters, cousins, and friends who were educated in other ways. Many other facts would have been interesting to ascertain, but it was deemed wiser to make the schedule so simple that even the busy mothers of young children would reply. Certain physiological questions were omitted in order not to tresspass upon another and more extended inquiry which was begun some time ago by another investigator.

In order to avoid clumsy repetition the college women will be referred to throughout the paper as Class A, and the non-college women as Class B.

The tabulations and diagrams were made by Mr. Walter E. Nichols, Stanford, '99, a student of social statistics, to whom I am indebted also for many valuable suggestions. The schedule blank used was as follows: —

1. Where was your academic, collegiate, or later education obtained? Degrees, if any? Honors or scholarships, if any?
2. At what age did you marry? How long married?
3. How many children have you had?
   (*a*) Now living (sex and age of each)?
   (*b*) Now dead (sex and age of each at death)? Cause of death?
   (*c*) Number still-born? Number of miscarriages?
4. Are your children delicate, moderately well, or robust? If any are delicate, why?
5. Did you have delicate, fair, good, or robust health before marriage? If delicate or fair only, was there any *special* cause for it?
6. Do you have delicate, fair, good, or robust health now? If this reply varies from question 5, to what do you attribute the change?

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7. Where was your husband's later education obtained?
   Degrees, if any?
   What is your husband's occupation?
8. What was your own occupation before marriage?
   How many years pursued?
9. Is your average yearly joint income less than $2000?
   Between $2000 and $5000? Over $5000?
10. Do you live in city, suburbs, or country?

TABLE I—A.

THREE HUNDRED AND FORTY-THREE COLLEGE-BRED MARRIED WOMEN, BY INSTITUTIONS, WITH DEGREES, HONORS, FELLOWSHIPS, AND SCHOLARSHIPS.

Name of Institution.	Bachelor's Degrees.	Master's Degrees.	Doctors of Philosophy.	Doctors of Medicine.	Honors.	Fellowships.	Scholarships.
Boston University	15	2	..	..	1	..	5
Brown University	..	1	..	..	..	..	.
Bryn Mawr College	6	2	..	..	..	3	2
California, University of	13	1	..	..	1	..	1
Chicago, University of	..	2	2	1	..	6	..
Colorado, University of	1	..	..	..	..	..	..
Columbia University	1	..	..	..	..	..	..
Cornell University	23	5	(D.Sc.) 1	..	8	1	3
Iowa, University of	1	..	..	..	..	..	..
Johns Hopkins University	..	..	..	..	..	1	..
Kansas, University of	5	2	..	..	2	..	..
Leland Stanford Jr. University	3	..	1	..	..	..	..
Mass. Institute of Technology	4	..	..	..	1	..	..
Michigan, University of	20	2	2	1	3	..	..
Nebraska, University of	1	..	..	.	1	..	..
Northwestern University	7	3	..	1	1	..	..
Oberlin College	16	2	..	..	1	..	..
Ohio Wesleyan University	1	..	..	..	1	..	..
Pennsylvania, University of	..	1	..	(D.D.S.) 2	..	..	..
Radcliffe College	6	..	..	..	..	1	..
Smith College	44	5	1	..	1	..	..
Syracuse University	11	9	3	..	5	..	..
Vassar College	83[1]	8	..	..	15	..	2
Vermont, University of	1	..	..	..	1	..	..
Wellesley College	50[2]	6	..	..	1	..	..
Wisconsin, University of	20	2	..	..	8	2	..
Woman's Medical College (N. Y.)	..	..	..	1	..	..	..
Woman's Medical College (Phila.)	..	..	..	1	..	..	..
Gottingen, Berlin	..	..	(LL.D.) 1	..	..	..	..
Zürich	..	1	..	..	..	..	..
Totals	332	54	11	7	51	14	13

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Table I—A gives in detail by institutions the degrees, honors, fellowships, and scholarships taken by Class A; eleven women took the bachelor's degree at institutions not to be ranked in this list, but a master's degree taken later entitled them to be counted in Class A. Of the total number 15 per cent took master's degrees, 23 per cent took honors or held fellowships and scholarships; 53 per cent took their bachelor's degree at one of four women's colleges (Vassar, Wellesley, Smith, Bryn Mawr), and 41 per cent at sixteen co-educational institutions ranging in location from Boston University to the University of California.

TABLE I—B.

THREE HUNDRED AND THIRTEEN NON-COLLEGE MARRIED WOMEN: SISTERS AND COUSINS NEAREST IN AGE, AND INTIMATE FRIENDS OF TABLE A, BY SCHOOLS, ETC.

Schools and Other Educational Institutions.	Sisters.	Cousins.	Friends.	Total.
Academy	7	8	16	31
Advanced art study	4	..	6	10
Advanced music study	7	..	9	16
Chautauqua course	1	..	2	3
High school	22	17	50	89
Other public schools	13	8	23	44
Manual training	1	..	1	2
Normal school	3	3	8	14
* Partial college course	7	1	20	28
Private schools	23	11	58	92
Private Teachers	4	1	11	16
Seminary	10	4	21	35
Travel	..	2	7	9
Totals	102	55	232	389
Unknown	..	..	..	8

* This includes those who attended college only a year, and those who attended colleges of a rank not higher than seminaries or normal schools.

Table I—B shows similar facts concerning 313 married women, sisters and cousins nearest in age, and friends of Table A, who did not go to college, but were educated in other ways. Of these, 305 give their education in 389 dif-

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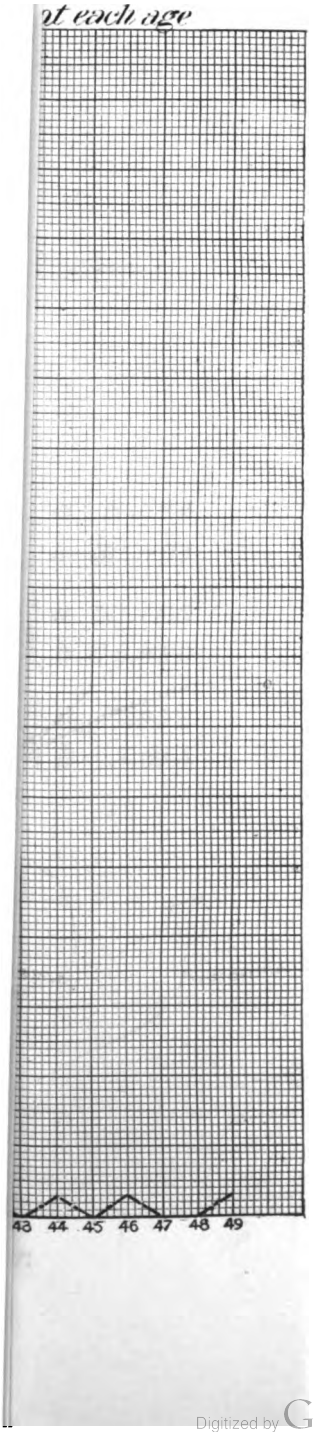

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ferent schools; some were educated partly in a public school and partly by private tutors; others graduated at a high school or a private school, and afterward traveled abroad or studied art or music. If the advanced art and music study and travel be left out of account, the remainder of the 389 educational opportunities are almost exactly divided between public and private schools.

It has generally been supposed that going to college delayed marriage; just how much it does so is shown by Table II—A and B. The mean age of marriage for Class A is 26.3 years; for the sisters, 24.2 years; for the cousins, 24.7 years; and for the friends, 24.2 years; an average for Class B of 24.3 years. Thus it appears that the marriage of a college women is postponed two years as compared with her non-collegiate relatives and friends. The number of the cousins (44) is too small to admit of any inference being drawn from the variation in age at marriage from that of the sisters. The second half of the table illustrates the postponement of marriage in a slightly different way: the average number of years of married life of Class A, 9.6, is three years less than their sisters, 12.6, two years less than their cousins, 11.7, and two and a half years less than their friends, 11.1. Fig. II—A and B illustrates graphically the conclusion reached in the consideration of Table II — A and B; Fig. II — C the same by age groups in still another way.

The postponement of marriage in the case of Class A as well as the percentage of women married at each age up to 37 in both classes is shown in Table II — C. Only 2 women of Class A married before 21 years of age, while 17 sisters, 2 cousins, and 25 friends, or 8 per cent of Class B, married before that age. After that, Class A steadily gains on Class B in the proportion marrying at each age, until between 33 and 34, 94 per cent of each class is married; after 34, Class A slightly surpasses Class B.

Table II — C shows not only that Class B married earlier than Class A but also that the non-college relatives and

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TABLE II—A AND B.

NUMBERS AND TOTAL YEARS OF MARRIED LIFE OF WOMEN OF BOTH CLASSES MARRYING AT SPECIFIED AGES.

Age at Marriage.	Number Women Marrying at a Specified Age.				Total Number of Years of Married Life of Women Marrying at a Specified Age.			
	College (Class A.).	Non-College. (Class B.)			College (Class A.).	Non-College (Class B).		
		Sisters.	Cousins.	Friends.		Sisters.	Cousins.	Friends.
17	..	1	..	..	....	25.00	....	....
18	..	3	..	4	....	88.00	....	70.00
19	..	7	1	9	....	117.50	21.00	156.33
20	2	6	1	12	47.33	107.50	18.00	247.50
21	9	10	3	11	86.50	176.00	54.00	149.58
22	18	7	5	16	214.67	88.00	69.58	198.40
23	36	6	5	28	441.50	82.00	56.50	276.33
24	41	8	10	20	517.20	49.20	150.00	214.30
25	48	11	6	13	520.20	116.10	51.50	115.20
26	44	3	1	16	334.00	27.50	5.00	190.20
27	32	4	4	13	265.30	38.00	45.00	164.20
28	21	3	..	24	167.20	51.00	....	156.90
29	24	2	1	6	189 50	9.00	2.50	41.00
30	22	4	1	7	167.90	29.50	7.00	50.70
31	8	2	1	1	74.20	9.00	9.00	11.00
32	5	4	1	2	48.50	24.20	14.00	13.00
33	10	1	..	2	109.50	8.00	....	34.00
34	5	..	1	3	25.60	....	4.50	17.80
35	5	1	..	1	45.20	6.00	....	15.00
36	2	..	..	..	2.50	....	....	....
37	2	..	1	1	8.70	....	4.00	6.50
38	1	..	..	..	6.50	....	....	....
39	1	..	..	1	9.00	....	....	3.00
40	..	..	..	..	....	....	....	....
41	1	..	..	..	1.00	....	....	....
42	..	..	1	..	....	....	1.50	....
43	..	..	..	..	....	....	....	....
44	..	..	..	1	....	....	....	2.00
45	..	..	..	..	....	....	....	....
46	..	..	..	1	....	....	....	2.50
47	..	..	..	..	....	....	....	....
48	..	..	..	..	....	....	....	....
49	..	..	1	..	....	....	1.10	....
Totals,	337	83	44	192	3282.00	1051.50	514.18	2135.44
Mean age	26.3	24.2	24.7	24.2	....	....	....	....
Average,	..	..	..	..	9.7	12.6	11.7	11.1

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TABLE II — C.

PERCENTAGE OF CLASS A AND CLASS B, AND OF EIGHT HUNDRED AND ONE NON-COLLEGE RELATIVES AND FRIENDS OF BOTH CLASSES MARRIED AT SPECIFIED AGES.

Age at Marriage.	Per cent Married at Specified Ages. Of Class A.	Of Class B.	Of Non-College Friends and Relatives of Class A.	Of Non-College Friends and Relatives of Class B.
17–21	....	8.00	17.64	13.55
21	0.30	13.40	25.69	24.28
22	8.00	21.00	35.98	38.68
23	19.10	29.70	46.94	51.67
24	31.20	42.00	57.67	61.83
25	45.40	55.80	67.96	75.11
26	58.30	63.20	73.77	80.76
27	67.80	69.40	80.48	85.36
28	74.00	76.10	84.28	88.75
29	81.10	84.50	86.06	92 70
30	87.50	87.20	90.98	95.24
31	90.00	91.60	92.54	95.52
32	91.20	92.20	94.77	95.80
33	94.30	94.50	95.44	96.37
34	95.80	95.50	95.88	96.37
35	97.30	96.90	97.22	98.34
36	98.00	97.20	97.66	98.62
37+	100.00	100.00	100.00	100.00

friends of Class A married earlier than either Class A or Class B, and that the non-college friends and relatives of Class B married earliest of all, *viz.*: —

50 per cent of Class A married between . . . . . 25 and 26 years of age.
" " " " " B " " . . . . . 24 " 25 " " "
" " " " " A's friends and relatives married between 23 " 24 " " "
" " " " " B's " " " " " 22 " 23 " " "

The lines drawn across the columns at 75 per cent and 90 per cent, respectively, show the same peculiarity. The effect of the kind and degree of education in delaying the marriage of both college and non-college is strikingly apparent.

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TABLE II — D.

AVERAGE AGE AT MARRIAGE OF CLASS A AND CLASS B BY NUMBER OF YEARS MARRIED.

	Married 10 Years or Less.		Married from 10 to 20 Years.		Married 21 Years and Over.	
	A.	B.	A.	B.	A.	B.
Average age at marriage..	26.8	25.9	26.1	24.2	24.2	21.6

Table II — D also shows that the age of marriage for both classes has been getting later and later; those that were married at the earlier ages — for the most part — are those who have been longest married. This would be inevitable as the entrance requirements of colleges have been gradually growing more severe during the past 30 years, thus postponing the age of admission and graduation, and presumably of marriage for Class A, as well as prolonging the period spent by Class B in public and private schools. In England in 1891 the average age of spinsters marrying was 24.8, and of spinsters of the professional and independent classes, 26.4. In Massachusetts for the twenty-year period, 1875–95, the average age of spinsters marrying was 25.4. The marriage of educated women is seen by comparison not to have been postponed so much beyond that of the average population as might have been expected.

Table III — A and B shows the number of living children of both classes by age and sex. Class A has an average of 55 per cent male children and 45 per cent female; Class B as a whole averages 47.7 per cent male and 52.3 per cent female; the curious variation of the sisters' (46 per cent male) and the cousins' children (43.6 per cent male), on the one hand, and the friends' (53.6 per cent male), on the other, is unaccountable, except on the supposition that the basis of numbers is too small. This is scarcely adequate, however, to account for the wide difference between the children of Class

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TABLE III—A AND B.

LIVING CHILDREN OF BOTH CLASSES BY AGE AND SEX.

Age of Children in Years.	Of 343 College Mothers.			Of 313 Non-College Mothers.						
				Sisters.		Cousins.		Friends.		Total.
	M.	F.	Total.	M.	F.	M.	F.	M.	F.	
Under 1	26	17	43	3	1	3	3	11	8	29
1	24	20	44	2	4	1	3	11	13	34
2	25	19	44	4	3	2	3	9	11	32
3	22	10	32	5	9	..	..	10	9	33
4	20	17	37	3	4	1	2	16	9	35
5	13	20	33	7	7	2	2	9	10	37
6	29	21	50	3	6	..	7	10	12	38
7	14	10	24	5	8	2	2	14	10	41
8	16	20	36	4	4	4	1	14	7	34
9	14	8	22	1	3	3	..	11	8	26
10	15	9	24	3	1	1	6	4	5	20
11	20	11	31	3	5	1	1	4	4	18
12	8	9	17	2	2	2	..	6	5	17
13	10	8	18	1	2	2	..	..	3	8
14	7	7	14	3	2	1	1	6	7	20
15	4	9	13	1	2	2	2	2	2	11
16	5	6	11	3	3	1	3	6	4	20
17	5	1	6	3	1	..	1	1	2	8
18	6	5	11	1	2	..	1	5	3	12
19	1	2	3	4	4	1	..	2	4	15
20	2	3	5	2	3	..	..	4	..	9
21	2	2	4	2	2	1	1	3	1	10
22	..	2	2	2	..	..	..	1	1	4
23	1	4	5	1	3	..	..	..	1	5
24	..	..	..	1	..	..	..	3	..	4
25	1	2	3	..	..	1	..	1	..	2
26	..	..	..	1	..	..	..	4	2	7
27	3	..	3	..	2	..	..	..	1	3
28	1	2	3	..	1	..	..	1	3	5
29	1	..	1	1	1	..	..	1	..	3
30	3	1	4	..	..	..	..	2	1	3
31	..	..	..	1	..	..	..	..	..	1
32	..	2	2	..	..	..	..	..	2	2
33	..	1	1	..	..	..	..	..	..	..
34	1	..	1	..	..	..	..	..	..	..
35	..	..	..	..	..	..	..	..	..	..
36	1	..	1	..	..	..	..	..	..	..
37	..	..	..	..	..	..	..	..	..	..
38	1	1	2	..	..	..	..	..	..	..
39	1	..	1	..	..	..	..	..	..	..
Age unknown	10	5	15	3	3	..	1	15	13	35
Age and sex unknown	..	..	..	..	..	..	..	..	..	3
Total number	312	254	566	75	88	31	40	186	161	584
Total per cent	55	45	..	46	54	43.6	56.4	53.6	46.4	..

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A (55 per cent male) and of Class B (47.7 per cent male). In an average population the proportion of children born is 52 per cent male to 48 per cent female. The basis of numbers is undoubtedly too small to warrant any discussion of the bearing of these facts upon the current theories of sex.

TABLE IV—A AND B.

NUMBER OF LIVING CHILDREN PER YEARS OF MARRIED LIFE IN BOTH CLASSES.

Age at Marriage.	Total Number of Years of Married Life.		Number of Living Children.		Number of Years of Married Life to Each Child.	
	A.	B.	A.	B.	A.	B.
17.....	....	25.0	..	3	....	8.33
18.....	...	158.0	..	17	....	9.30
19.....	....	294.8	..	44	....	6.70
20.....	47.3	373.0	7	53	6.76	7.03
21.....	86.5	379.6	16	42	5.40	9.03
22.....	214.6	356.0	35	60	6.13	5.93
23.....	441.5	414.9	69	87	6.40	4.76
24.....	517.2	413.6	78	77	6.63	5.37
25.....	520.2	282.9	88	49	5.91	5.77
26.....	334.0	222.7	81	40	4.12	5.56
27.....	265.3	247.2	52	28	5.10	8.82
28.. ...	167.2	207.9	34	28	4.91	7.42
29.....	189.9	52.9	16	9	11.93	5.84
30.....	167.9	87.2	31	16	5.42	5.45
31.....	74.2	29.0	10	6	7.42	4.83
32.....	48.5	51.2	9	12	5.40	4.28
33.....	109.5	42.0	14	5	7.82	8.40
34.....	25.6	22.2	6	6	4.26	3.70
35.....	45.2	21.0	3	..	15.08	....
36.....	2.5	....	..	..	....	....
37.....	8.7	10.5	..	..	....	....
38.....	6.5	....	..	..	....	....
39.....	9.0	3.0	..	..	....	....
40.....	....	....	..	..	....	....
41.....	1.0	....	..	..	....	....
42.....	....	1.5	..	..	....	....
43.....	....	....	..	..	...	....
44.....	....	2.0	..	..	....	....
45.....	....	....	..	..	....	...
46.....	....	2.5	..	..	....	....
47.....	....	....	..	..	....	....
48.....	....	....	..	..	....	....
49.....	....	1.8	..	..	....	....
Total...	3282.3	3702.4	549	582	5.97	6.71

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In Table IV—A and B the apparent gain to the population through the earlier marriage of Class B is very striking. Class B beginning to marry at the age of 17 has 477 years of married life and 64 more children than Class A who begin to marry at 20. No woman of either class who married after the age of 35 has any living children. Consequently the child-bearing period lies between 17 and 35 years for Class B and between 20 and 35 for Class A. Dividing the total years of married life of each class by the number of living children of each class, respectively, it appears that Class A bore one child to every 5.97 years of married life, while Class B bore one child to 6.71 years of married life. If the 477 years of married life and the 64 children be subtracted from the totals of Class B the number of years of married life to each child varies only a quarter of a per cent, *i. e.*, 5.97 for Class A, 6.22 for Class B. Thus it appears that the college women bore more children per years of married life than the non-college women in spite of the earlier marriage of Class B.

Having ascertained the average number of years of married life to each child in both classes with certain antecedent data, the next step is to discover the number of children per woman. Table V—A and B gives this fact in conjunction with several others. Class A has borne on the average 1.65 children in 9.6 years of married life; while Class B has borne 1.875 children in 11.6 years of married life. This corroborates the results of the only English* statistics which are comparable. Mrs. Sidgwick gives 1.53 as the number of children per marriage of English women students in 1890 and 1.81 as that of their sisters. Absolutely Class B has borne a slightly larger number of children per marriage than Class A; but in proportion to the number of years of married life Class A has borne 9 per cent more children than Class B. In both English and American statistics the number of children born to *each year of marriage* is slightly larger for the

* Sidgwick, Mrs. Henry: *Health Statistics of Women Students of Cambridge and Oxford and of their Sisters.* Cambridge: University Press, 1890.

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TABLE V—A AND B.

AVERAGE NUMBER OF LIVING CHILDREN TO EACH WOMAN BY AGE AT MARRIAGE AND NUMBER OF YEARS MARRIED.

Age at Marriage.	Percentage of Women Marrying at Each Age.		Average Number of Years Married to Each Marriage.		Average Number of Living Children to Each Woman.	
	Class A.	Class B.	Class A.	Class B.	A.	B.
17.....	....	.31 +	....	25.00	...	3.00
18.....	....	2.19 +	....	22.57	....	2.42
19.....	....	5.32 +	....	17.34	....	2.58
20.....	.59 +	5.95 +	23.66	19.63	3.50	2.78
21.....	2.66 +	7.52	9.61	15.81	1.77	1.75
22.....	5.32 +	8.77	11.92	12.71	1.94	2.14
23.....	10.66 +	12.22 +	12.26	10.63	1.91	2.23
24.....	12.13 +	11.91 +	12.61	10.88	1.90	2.02
25.....	14.20 +	9.40 +	10.83	9.42	1.83	1.63
26.....	13.02 +	6.27 +	7.60	11.13	1.84	2.00
27.....	9.47 +	6.58 +	8.29	11.77	1.62	1.38
28.....	6.21 +	8.46 +	7.96	7.70	1.61	1.03
29.....	7.10 +	2.82 +	7.91	5.84	.66	1.00
30.....	6.51 +	3.76 +	7.62	7.27	1.40	1.33
31.....	2.36 +	1.25 +	9.28	7.25	1.25	1.50
32.....	1.48 +	2.19 +	9.70	7.32	1.80	1.71
33.....	2.96 +	.94	10.95	14.00	1.40	1.66
34.....	1.48 +	1.25 +	5.11	5.56	1.20	1.50
35.....	1.48 +	.62 +	9.05	10.50	.60	....
36.....	.59 +	....	1.25	....	....	....
37.....	.59 +	.62 +	4.37	5.25	....	....
38.....	.29	....	6.50	....	....	....
39.....	.29	.31 +	9.00	3.00	....	....
40.....	....	....	....	....	....	....
41.....	.29 +	....	1.00	....	....	....
42.....	....	.31 +	....	1.50	....	....
43.....	....	....	....	....	....	....
44.....	....	.31 +	....	2.00	....	....
45.....	....	....	....	....	....	....
46.....	....	.31 +	....	2.50	....	....
47.....	....	....	....	....	....	....
48.....	....	...	....	....	...	....
49.....	....	.31	....	1.08	....	....
Totals..	100.00	100.00	9.60	11.60	1.65	1.875

college women than for the non-college women; in both cases, also, the number of *children per woman* is slightly less for the college than for the non-college women. The 107 Ameri-

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can women who took advanced degrees and honors have borne 1.61 children on the average, although the age of marriage of those who took the Ph.D. is somewhat higher than the average.

TABLE VI—A AND B.

NUMBER OF CHILDLESS WOMEN IN RELATION TO THE YEARS OF MARRIED LIFE.

Number of Years Married.	Number of Childless Women. Class A.	Number of Childless Women. Class B.	Total.
Less than 1.....	11	3	14
1.....	10	5	15
2.....	10	7	16
3.....	6	4	11
4.....	6	6	12
5.....	5	1	6
6.....	10	5	15
7.....	5	..	5
8.....	6	1	7
9.....	1	3	4
10.....	1	1	2
11.....	3	3	6
12.....	..	2	2
13.....	..	2	2
14.....	2	3	5
15.....	2	1	3
16.....	1	..	1
17.....	2	..	2
18.....	2	1	3
19.....	..	2	2
20.....	1	..	1
21.....	..	1	1
22.....	..	..	..
23.....	..	..	..
24.....	1	..	1
25.....	..	2	2
26.....	..	1	1
27.....	..	..	..
28.....	1	..	1
29.....	..	..	..
30.....	1	2	3
Total.....	87	56	143
Per cent childless..	25.36	17.89	21.79

In Table VI—A and B 25.4 per cent of Class A and 17.9 per cent of Class B are childless; but it appears that 21 women of Class A as against 8 women of Class B have been

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married less than 2 years. If all who have been married less than 2 years be subtracted from the table, then 19.2 per cent of Class A and 15.3 per cent of Class B were childless. If the 87 childless women be subtracted from the total of Class A and the 56 childless women from the total of Class B, the child-bearing members of Class A have borne 2.21 children per woman, and the child-bearing members of Class B 2.28 children per woman. It appears also that the mothers belonging to Class A have borne one child to every 4.82 years of marriage, while the mothers in Class B have borne one child to every 5.51 years of marriage. If it be taken into account that Class A has been married on the average

TABLE VII—A AND B.

DEAD CHILDREN OF CLASSES A AND B.

Age of Mothers at Marriage.	Of Class A.				Of Class B.			
	Miscarriages.	Still Births.	Under 1 Year.	1 Year and Over.	Miscarriages.	Still Births.	Under 1 Year.	1 Year and Over.
17	..	..	..	..	....	....	..	1
18	..	..	..	..	....	....	..	..
19	..	..	..	..	....	....	1	6
20	..	..	2	..	....	....	4	5
21	..	..	4	..	....	....	5	..
22	..	..	6	2	....	....	4	1
23	..	..	5	7	....	....	9	4
24	..	..	6	3	...	....	5	3
25	..	..	5	2	....	....	4	1
26	..	..	7	1	....	....	3	1
27	..	..	2	2	....	....	4	4
28	..	..	4	1	....	....	5	4
29	..	..	2	2	....	....	..	..
30	..	..	4	1	....	....	1	1
31	..	..	1	1	....	....	..	..
32	..	..	..	1	....	....	..	..
33	..	..	2	..	....	....	1	1
34	..	..	..	1	....	....	..	..
35 and over	..	..	..	..	....	....	..	..
Total dead	108	9	50	24	89	14	45	33

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2 years less than Class B, it may be concluded that when the child-bearing period of both classes shall have passed, Class A will not only have borne more children per years of married life, but will probably have borne as many — possibly more children per woman than Class B.

Table VII—A and B. Miscarriages as well as still-births have been included in this table. It is exceedingly doubtful, however, whether the figures have any value. Women hesitate to confess such misfortunes, and the internal evidence of the blanks shows that Class B was more reluctant to fill out this portion of the schedules than Class A. Including miscarriages, Class A lost 25.2 per cent of all conceptions, while Class B lost only 23.6 per cent. If the miscarriages be omitted from both classes, Class A lost 12.8 per cent, and Class B 13.6 per cent. If, again, both miscarriages and still-births be omitted, it appears that Class A lost 11.5 children after birth, and Class B 11.6 per cent. The basis of numbers is too small to draw conclusions, but the result is of negative significance as showing that there is no marked difference between the two classes in respect to mortality of children.

TABLE VIII.

HEALTH OF CHILDREN OF CLASS A AND CLASS B.

Health.	Children of Class A.	Children of Class B.	Totals.	
			Per cent A.	Per cent B.
Delicate	21	27	3.7	4.6
Moderately well	250	278	44.2	47.4
Robust	295	282	52.1	48.0
Totals	566	587	100.0	100.0

Table VIII — A and B shows no striking difference in the health of the children of the two classes; 96.3 per cent of A children, and 95.4 per cent of B children have satisfactory health. The slight difference there is, however, is in favor of Class A.

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TABLE IX—A AND B.

HEALTH OF BOTH CLASSES AFTER MARRIAGE BY NUMBER OF CHILDREN BORNE.

Number of Children Borne.	Health Improved After Marriage.								Health the Same as Before Marriage.		Health Declined After Marriage.							
	Number Whose Health Improved						Total Number of Points Improved.				Number Whose Health Declined						Total Number of Points Declined.	
	1 Point.		2 Points.		3 Points.						1 Point.		2 Points.		3 Points.			
	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.
1	19	13	4	4	..	..	27	21	50	44	11	8	1	1	1	..	16	10
2	18	15	3	1	..	..	24	17	46	49	6	10	2	3	2	..	16	16
3	4	13	3	2	..	1	10	20	30	26	8	4	1	5	.	..	10	14
4	4	7	1	3	..	..	6	13	13	18	5	8	..	..	..	..	5	8
5	3	1	..	2	..	..	3	5	11	5	2	3	..	1	..	..	2	5
6	3	1	..	..	..	..	3	1	4	6	2	1	..	..	..	..	2	1
7	..	..	..	..	..	..	..	..	1	2	..	2	..	..	..	..	..	2
8	..	..	..	..	..	.	..	..	2	..	..	..	..	..	..	..	..	..
Total number	51	50	11	12	..	1	73	77	157	152	34	36	4	10	3	..	51	56
Total per cent	..	..	..	..	..	..	..	..	60.4	58.2	..	..	..	..	..	..	..	..

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Table IX — A and B compares the health of the two classes before and after marriage; the schedules exhibit four grades of health,— delicate, fair, moderately well, robust; in tabulation an improvement or decline of one grade was registered as one point. In the case of Class A the health of 23.9 per cent improved, 15.7 per cent declined, and 60.4 per cent remained the same. Of Class B 24.1 per cent improved, 17.6 per cent declined, and 58.2 per cent remained the same. The difference in the method of education has evidently made no marked difference in the health of either class after marriage. The conclusion arrived at is again chiefly negative, there being only a slight difference in favor of Class A.

TABLE X–A AND B.

OCCUPATIONS BEFORE MARRIAGE OF 343 A AND 313 B WOMEN.

Occupations of Both Classes.	Number of A.	Number of B.	Average Number Years Spent in each Occupation. A	Average Number Years Spent in each Occupation. B	Per cent of Total Number in each Occupation. A	Per cent of Total Number in each Occupation. B
Teaching	190	70	4.28	4.86	55.4	22.4
Home or domestic	39	61	2.91	3.92	11.4	19.5
Clerical	9	12	3.29	3.65	2.6	3.8
Studied or married upon graduation	32	12	3.50	2.00	9.3	3.8
Journalism	4	....	6.50	....	1.2	....
Professional	5	1	5.20	3.00	1.4	.31
Philanthropic	5	....	5.60	....	1.4	....
China painting and art embroidery	2	....	2.00	....	.6	....
Music study	....	5	....	7.50	....	1.6
Singer	....	2	....	6.50	....	.63
Artist	....	2	....	12.00	....	.63
Working girl (saleswoman, typewriter, factory)	....	5	....	7.00	....	1.59
Dressmaker and milliner	....	2	....	5.50	....	.63
Matron in State institution	....	1	....	3.00	....	.31
No occupation	25	74	3.00	....	7.3	23.60
None stated	32	66	....	....	9.3	21.10
Totals	343	313	4.15	4.88	100.0	100.00

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Table X — A and B shows that 55 per cent of the college women had been teaching 4.28 years each before marriage, while only 22.4 of the non-college women had been teaching 4.88 years each. Of Class A 11.4 per cent, as compared with 19.5 per cent of Class B, remained at home until marriage; 16.6 per cent of Class A, as compared with 44.7 per cent of Class B, either had no definite occupation before marriage or stated none.

More than one-half of the college women were engaged in teaching, and nearly three-fourths in some occupation outside of their own homes before marriage. Less than one-fourth of the non-college women were engaged in teaching, and only slightly more than one-third were engaged in some occupation outside their own homes before marriage. Evidently collegiate education for women results in wage earning; it may be that the girls who go to college are a selected class of greater initiative, or with the purpose of wage earning already formed, or it may be that this kind of education develops a desire to work; whatever the cause, the result is a striking degree of economic independence before marriage.

In Table XI — A and B it is apparent that 77 per cent of the college women married college or university men, that is, men as well educated as themselves; it implies also that 23 per cent of them married men whose education was nominally, at least, inferior to their own. On the other hand, 51 per cent of the non-college women married men whose education was technically, at least, superior to their own. This marked difference is further emphasized by the occupations of the husbands; 65 per cent of the husbands of Class A are professional men,— 57 per cent, indeed, are teachers, lawyers, physicians, scientists, or clergymen; while only 37 per cent of Class B married men of this class, and the remaining 63 per cent married men in business life. Apparently women and men of higher mental training demand intellectual companionship in marriage, while women of less severe and ex-

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tended training find companionship in men of tastes not obviously literary or scientific.

TABLE XI-A AND B.

EDUCATION AND OCCUPATIONS OF THE HUSBANDS OF CLASS A AND CLASS B.

* Education of Husbands of			Occupation of Husbands of		
	A	B		A	B
College or university	226	161	Teacher	80	37
West Point and Annapolis	3	3	Lawyer	54	35
Normal school	1	2	Physician	31	27
Public school	11	38	Scientist (investigator, botanist, chemist, astronomer, metallurgist)	7	2
High school	30	34	Clergyman	24	15
Academy	7	16	Artist	3	1
Private school	4	12	Engineer	10	12
Business college	6	5	Architect	2	2
Business life	1	3	Journalist	11	9
Shop	1	2	Dentist	1	3
Self-educated	2	3	Veterinarian	1	..
No education	....	3	Army and navy	3	3
None stated	11	* 31	Business	25	30
			Merchant	28	34
			Importer	2	..
			Banker	13	10
			Manufacturer	12	18
			In trade	..	10
			Broker	4	3
			Railroading	4	1
			Superintendent	5	7
			Druggist	1	2
			Hotel keeper	..	1
			Clerks and salesmen	9	29
			Agriculturist	1	17
			Philanthropist	1	..
			Retired	3	1
			None stated	8	4
	343	313		343	313

* The husbands are not necessarily graduates but have attended the institutions named for a longer or shorter period.

Table XII — A. In this table we see that the graduates of women's colleges married 15 per cent less college men than the coeducated women; *i. e.*, the graduates of women's col-

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leges have married a larger proportion of business men. Subdividing the 246 college-bred husbands into two classes, *i. e.*, those who graduated from men's colleges, and those who were coeducated, we find that 84 per cent of the separately educated men married women's-college graduates, while 75 per cent of the coeducated men married coeducated women. It

TABLE XII-A.

EDUCATION OF 332 HUSBANDS OF COEDUCATED AND WOMEN'S COLLEGE GRADUATES (CLASS A).

Education of Husbands.*	Number of Wives Graduated from		Percentage of Wives Graduated from	
	Coeducational Colleges.	Women's Colleges.	Coeducational Colleges.	Women's Colleges.
College bred.....	124	122	82.7	64.0
Non-college.....	22	54	14.7	29.7
Education not stated... ...	4	6	2.6	3.3
Totals.....	150	182	100.0	100.0

* Husbands of women graduated from annexed or affiliated colleges are omitted.

further appears that 90 per cent of the men who married coeducated women graduated at the *same* institution as their wives, and only 10 per cent from others. Although on the average 4.93 years elapsed between graduation and marriage, the acquaintance made in college seems to have determined the marriage of a large proportion of the coeducated women. Whether on this account the coeducated women have a better chance of marriage than the graduates of women's colleges, is an interesting point upon which we have no data.

In the first two columns of Table XIII — A and B it appears that Class B has 12 per cent more women among those having the lowest income, and 10 per cent less among those having the highest income, than Class A. This is surprising when taken in connection with the fact that Class B, as shown by the occupation table (XI—A and B), is dis-

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TABLE XIII. HEALTH AND INCOME OF CLASSES A AND B.

Joint Annual Income of Family.	Class A.		Class B.		Delicate Before Marriage.			
					A		B	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Less than $2000	84	24.5	115	36.7	6	40.0	12	70.6
From $2000 to $5000	160	46.6	138	44.1	5	33.4	5	29.4
Over $5000	93	27.1	53	16.9	4	26.6	....	....
Not given	6	1.8	7	2.3	..	...	...	....
Totals	343	100.0	313	100.0	15	100.0	17	100.0

Joint Annual Income of Family.	Wives whose Health has Declined.				Delicate Children.				Per cent Having Specified Incomes.	
	A		B		A		B			
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Graduates of Coeducational Colleges.	Graduates of Women's Colleges.
Less than $2000	11	26.8	25	50	6	35.3	8	80	32.6	15.9
From $2000 to $5000	12	29.2	16	32	7	41.2	2	20	46.0	48.4
Over $5000	18	43.9	9	18	4	23.5	..	..	18.0	34.6
Not given	....	....	....	....	....	....	..	..	3.4	1.1
Totals	41	100.0	50	100	17	100.0	10	100	100.0	100.0

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tinctly less independent and more domestic than Class A. It is a matter of current opinion that the "average" man is more attracted by the non-college woman, that is, the woman of distinctly domestic tastes and accomplishments. The "average" man is generally engaged in business, and his chance of securing an income above $5000 is likely to be far greater than that of the professional man. It was therefore to have been expected that the non-college women would have the larger average income.

The standard of living of educated persons is very exacting in certain particulars, as, for instance, in the great amount of household service required, the more exquisite care of children, and the greater amount spent for their education. An income of less than $2000 per year for such persons means either partial service or none at all, and excessive economy in order to meet this standard. This throws a greater strain on the housewife. Of the two classes under observation, Class A has apparently borne this strain better than Class B, for Class B contains relatively a larger percentage of delicate wives and children among those whose income is less than $2000. It may be surmised either that the college women have better health or that they economize their strength more wisely and live more simply.

The last two columns of the table bring out a curious contrast in income between the graduates of coeducational and of women's colleges. Nearly one-third of the coeducated women have incomes below $2000, while a little more than one-third of the graduates of women's colleges have incomes above $5000. It has already been noted in Table XII that the graduates of women's colleges married a larger proportion of business men, and the coeducated women a larger proportion of professional men. It is evident, therefore, that the higher average incomes of the women's college graduates is due to the fact that their husbands are largely engaged in business. The lower average income of the coeducated

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women is, on the other hand, attributable to the fact of their having married a larger proportion of salaried professional men. From the strictly financial point of view, the graduates of women's colleges have married best, the coeducated women next, and the non-college women least successfully.

Conclusions.

In the absence of all statistics of classes in the population of the United States by education, the college man and woman have commonly been compared with the average person of the state or federal census. Such comparison is obviously unjust. The attempt to eliminate for women every considerable factor of difference except education narrows the inquiry to two small selected classes, — married college women and their relatives and friends who have been educated in other ways. No inferences have been drawn, therefore, which have not seemed wholly warranted by a marked difference between the two classes. The most striking result has been a negative one, *viz.*, that there is by no means the degree of difference between the two classes, in matters of health, marriage, and child-bearing capacity that has been looked for both by the friends and the enemies of the collegiate education of women. A summary of the conclusions reached in the previous pages will show this more clearly.

1. The marriage of college women was postponed two years as compared with that of the non-college women (26.3 *vs.* 24.3 years).

2. The age of marriage for both classes has been growing later in the last 30 years but varies only slightly from that of England (26.4), and Massachusetts (25.4).

3. The college women have a high percentage of male children (55) as compared with non-college women (47.7).

4. The non-college women have been married an average of two years longer than the college women, and have borne a slightly larger number of children; but the college women

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have borne the larger number of children per years of married life.

5. There is practically no difference between the two classes in respect to misfortunes attendant upon pregnacy or mortality of children.

6. The health of the children of both classes is about equally satisfactory, the percentage of delicate children being slightly less and of robust children slightly more in the case of college mothers.

7. There is no marked difference between the classes in respect to health before or after marriage.

8. Before marriage more than one-half the college women were engaged in teaching and nearly three-fourths in some occupation outside their own homes; less than one-fourth the non-college women were teaching and only slightly more than one-third were engaged in occupations outside their own homes. Obviously college training leads to a high degree of economic independence.

9. Three-fourths of the college women married college men, while only one-half of the non-college women married college men.

10. Sixty-five per cent of the college women, as compared with 37 per cent of non-college women, married professional men; 63 per cent of the non-college women married business men.

11. From the financial standpoint the college women married better than the non-college.

Thus it appears that the college women, although marrying two years later than their sisters, cousins, and friends, have borne a slightly larger number of children per years of married life, and that there is practically no difference between them as regards the mortality of children, health before and after marriage, or accidents of pregnacy. These conclusions are nearly identical with those reached by Mrs. Sidgwick ten years ago concerning the English college women, as compared

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with their non-college sisters. The most striking contrast between the two classes appears in the marked tendency of college women to earn their own living before marriage, to marry college-educated and professional men, and in the fact of their higher average income. Some of the most interesting minor results are the differences between the coeducated women and the graduates of women's colleges. Coeducated women married a larger proportion of college men and of coeducated men, while the graduates of women's colleges largely married men who were educated in men's colleges. The generally accepted opinion that coeducational colleges promote marriage is seen to have good foundation, while the supposed prejudice of separately educated men against coeducated women is illustrated as well. That the women's college graduates should have a higher average income than the coeducated women would follow from the difference in their husbands' occupations, but that the college women as a class should have married better financially than the non-college, was scarcely to have been anticipated.

Certain other interesting facts which cannot be tabulated statistically are revealed by the answers to the schedules. The questions in regard to health of mothers and children bring out prominently the fact that marriage develops a sense of responsibility. Almost without exception the women speak of taking better care of themselves after marriage. There are several pronounced cases where teaching is responsible for the loss of health before and after marriage. The reasons for improvement in health after marriage are most interesting. The college women particularly speak enthusiastically; such phrases as: domestic life less wearing, happiness in companionship and sympathy, contentment, congeniality, freedom from strain, less worry, more active life, better nourishment, greater regularity, child bearing, greater care of health — recur again and again in their replies. Apparently the college women, having been out in the world

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to earn their own living, appreciate the happiness, serenity, and protection of home life. Class A, too, have much more to say about hygienic living after marriage in contrast to nervous strain and bad conditions of teaching especially before marriage.

The reasons for decline in health are not given very fully, and may be condensed under such general heads as "overwork before marriage," "carelessness of health," "anxiety and strain after marriage," "overwork during pregnancy," "child bearing," "ignorance."

The tenor of the replies would indicate that the college women have a greater sense of responsibility in marriage and motherhood; that they lay more emphasis on hygienic knowledge; and that they are personally more contented with the conditions of their married life. Since the non-college women filled out their blanks somewhat less fully, too much emphasis should not be placed on this contrast, but the contrast is unmistakable.

So far as these statistics show, the type of education is less responsible for the success or failure of women in domestic life than the subject matter of that education and the conditions under which it is pursued. The college-trained woman has apparently held her own in domestic life, as compared with women of her own class, in spite of the strain of college routine and the generally unhygienic conditions of living which formerly prevailed in colleges open to women.

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THE COMPARATIVE ACCURACY OF DIFFERENT FORMS OF QUINQUENNIAL AGE GROUPS.

By Allyn A. Young.

The United States census reports the ages of the persons enumerated by single years. Over one hundred age classes are thus differentiated. It is, of course, impracticable to combine so detailed a classification with the results of more than a few other census inquiries. In the majority of cases in which the census differentiates economic or social classes by age, recourse must be had to age groups. As the importance of age statistics is due in large part to the added value which they give to other results of the census, the form of groups used deserves careful consideration.

From the standpoint of accuracy a classification by groups is preferable to one by single years. Because of the excessive concentration of reported ages on the years which are multiples of 5, a quinquennial grouping is especially accurate.

The numerical accuracy of an age group depends upon the ratio between the number of reported ages which it includes and the number of persons enumerated whose true ages would be included within the same group. If the field of attraction of each age at which concentration occurs does not extend beyond the limits of one age group, the degree of concentration will not affect the accuracy of the age groups. The most accurate form of age group, then, is one which will include with each year of concentration the years from which this concentration is chiefly drawn. The choice of an age group should be influenced by the manner in which concentration takes place. Is it then the prevailing tendency simply to return one's age at the nearest year of concentration? Is there a special tendency to return ages at less than the truth? If there is such a tendency, is it strong enough to affect the comparative accuracy of different

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forms of age groups? It is evident that we must be able to answer these questions definitely before we can have a basis for judging the accuracy of a method of age grouping.

If quinquennial groups are used, a method that naturally suggests itself is to place the five lowest ages of the table in the first group, the next five ages in the second group, and so to the end of the table. This method is used by the United States census. There is no reason to believe that its adoption was influenced by any special reasons beyond those of convenience. Criticisms that have been made on this form of grouping have been based on the fact that each group begins with a multiple of 5, that is, with a year of concentration. Mr. George K. Holmes has made the following criticism: —*

> It seems generally to be agreed by those who have given the distribution of ages as reported by the enumerators any consideration for the purpose of tabulating them, that such a grouping as this should not be repeated. The years which are notoriously erroneous, that is, the quinquennial and decennial years, are placed at one end in each classification.
>
> . . . . . .
>
> I would suggest that a quinquennial grouping should be continued, under a new arrangement, the first group to contain ages under three, the next group to be 3 to 7 years, 8 to 12, 13 to 17, and so forth. This would place the especially erroneous years in the middle of the groups in each case.

Mr. Holmes does not state why it is preferable to place the "especially erroneous years in the middle" rather than at the end of the groups. But it is evident that his criticism rests upon the assumption that the prevailing tendency is to return ages at the nearest year of concentration; that is, that approximately as many persons are returned as older than the truth as are returned as younger than the truth, or, in other words, that over statement of age and under statement of age are about equally common.†

* *The Federal Census*, Publications of the American Economic Association, New Series, No. 2, pp. 57, 58.

† As a matter of fact, if all wrongly reported ages were returned at the nearest year of concentration, the number returned as greater than the truth would be slightly larger than the number returned as less than the truth.

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It is possible to test this hypothesis and thus to arrive at definite conclusions concerniug the accuracy of different forms of quinquennial age groups. We have as a starting point the fact that concentration is greater on years which are multiples of 10 than on years which are multiples of 5 and not of 10. The greater the concentration the greater, of course, will be the depletion in the years from which the concentration is drawn. The depletion resulting from concentration on the even multiples of 5 will be greater than that resulting from concentration on the odd multiples of 5. Now, as already stated, the most accurate form of quinquennial age group is one which includes with each year of concentration the years from which the concentration is mainly drawn. If, however, the system of grouping is such that each group excludes some of the years of depletion which have contributed mainly to the year of concentration in that group, and includes some of the years of depletion that have contributed to the year of concentration in the next group, the effect will be to enlarge the groups containing the multiples of 10 at the expense of the other groups. In other words, if the quinquennial groups are so formed that the fields of attraction of the years of concentration extend beyond the limits of the several groups, a year which is a multiple of 10 would draw relatively more from the neighboring groups than would a year which is an odd multiple of 5. This would result in making the groups alternately too large and too small. The excess of the number of reported ages in groups containing years that are even multiples of 5 over the number reported in groups containing years which are odd multiples of 5 is a measure of the comparative inaccuracy of a system of age grouping. This point may be brought out more clearly by an illustration.

If Mr. Holmes' hypothesis that the erroneously reported years are drawn equally from above and below the year of concentration is correct, an age group containing the years 43–47 should be more accurate than the group 45–49,

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although both groups contain the year of concentration 45. The years 48 and 49 would have been drawn upon to make up the large concentration of the year 50, and would therefore be depleted to a greater extent than would the years 43 and 44. The group 43–47 would therefore (on Mr. Holmes' hypothesis) be *relatively** larger than the group 45–49. In this case also the group 48–52 would be *relatively* smaller than the group 50–54.† Evidently the excess of the concentration on the multiple of 10 over that on the odd multiple of 5 has less effect on the relative sizes of the groups which we have assumed to be the more accurate than on the other form of groups. The principle thus illustrated may be expressed as follows:—

Of two series of quinquennial age groups, the more accurate will be the one in which the alternate excess and deficiency in the size of the successive groups is less marked.

To apply this principle to the census age returns, we may represent the relative size of each age group by the expression $\frac{G_x}{G_{x-1} + G_{x+1}}$.‡ Here G_x represents the number enumer-

* By the *relative* inequality of age groups is here meant an inequality distinct from the natural inequality caused by the fact that as age increases population decreases.

† This illustration may be presented more clearly by the use of mathematical symbols. In the following equations the signs of inequality are used as referring to *relative* and not to absolute inequality:—

Let P_x = number reported at any age x.

Let G_5 = number reported in group containing multiple of 5.

Let G_{10} = number reported in group containing multiple of 10.

If $G_5 = P_{43} + P_{44} + (P_{45} + P_{46} + P_{47})$

and $G'_5 = (P_{45} + P_{46} + P_{47}) + P_{48} + P_{49}$,

$G_5 - G'_5 = (P_{43} + P_{44}) - (P_{48} + P_{49})$

Since $(P_{43} + P_{44}) > (P_{48} + P_{49})$, $G_5 > G'_5$. (A)

Similarly, if

$G_{10} = P_{48} + P_{49} + (P_{50} + P_{51} + P_{52})$

and $G'_{10} = (P_{50} + P_{51} + P_{52}) + P_{53} + P_{54}$

Since $(P_{48} + P_{49}) < (P_{53} + P_{54})$, $G_{10} < G'_{10}$. (B)

From (A) and (B) we conclude that

$(G_{10} - G_5) < (G'_{10} - G'_5)$.

‡ This expression represents the numerical relation of each age group to the sum of the two neighboring groups. For our purposes such an expression is much preferable to one which represents the numerical size of an age group in its relation to the entire number of ages reported.

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ated in any age group x. The following table illustrates the application of this expression and also shows the true relations between various age groups in a normal stationary population. For convenience the results are expressed in percentages: —

TABLE SHOWING PROPORTION OF NUMBER IN EACH AGE GROUP TO THE SUM OF THE NUMBERS IN THE TWO NEIGHBORING GROUPS. BASED ON FARR'S LIFE TABLE NO. 3, l_x COLUMN.

Age Group.	G_x	$G_{x-1} + G_{x+1}$	$\frac{G_x}{G_{x-1} + G_{x+1}}$ Expressed as a Per Cent.
0–4	4,166,056	.. ...	....
5–9	3,602,611	7,641,334	47.1
10–14	3,475,278	7,185,525	48.4
15–19	3,382,914	6,732,376	50.2
20–24	3,257,098	6,493,061	50.2
25–29	3,110,147	6,212,843	50.1
30–34	2,955,745	5,904,065	50.1
35–39	2,793,918	5,578,370	50.1
40–44	2,622,625	5,232,548	50.1
45–49	2,438,630	4,860,278	50.2
50–54	2,237,653	4,445,063	50.3
55–59	2,006,433	3,969,355	50.5
60–64	1,731,702	3,413,225	50.7
65–69	1,406,792	2,768,339	50.8
70–74	1,036,637	2,065,137	50.2
75–79	658,345	1,374,418	47.9
80–84	337,781	787,925	42.9
85–89	129,580	371,759	34.8
90–94	33,978	135,081	25.2
95–99	5,501	.....	...

It will be noted that during the periods of youth and middle age, when the death rate is fairly constant, the number reported in each age group is slightly in excess of the arithmetic mean of the numbers reported in the two neighboring groups. It is very improbable that an accurate table of the ages of an actual population, constituted as is the population of the United States, would exhibit any such regularity in the numerical relations of the different age groups. But if we discover a *uniform irregularity* in the

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returns for different classes of the population we may safely conclude that such an irregularity is due to the manner in which ages are reported and not to the peculiar age composition of the population.

As a preliminary to the application of this test to the census returns, the ages of the population of the United States, as reported in 1890, have been grouped by three methods. The census plan is followed in the first method, a year of concentration being placed at the beginning of each group. The second method is the one suggested by Mr. Holmes, the third or median year of each group being a year of concentration. In the last method the year of concentration is placed at the end of the group. For convenience these methods will be referred to as Method I, Method II, and Method III, respectively. The following tables show the comparative numerical values of the age groups formed by these three methods for different classes of the population: —

PERCENTAGE RELATION BETWEEN THE NUMBER REPORTED IN EACH SPECIFIED AGE GROUP AND THE NUMBER REPORTED IN THE TWO NEIGHBORING AGE GROUPS, WHEN THE FIRST YEAR OF EACH GROUP IS A YEAR OF CONCENTRATION.

[*Method I.*]

Age Groups.	Aggregate Population.			Native White.		Colored.	
	Total.	Male.	Female	Total.	Female.	Total.	Female.
5–9	51.6	51.3	51.9	58.0	58.3	52.5	53.0
10–14	49.8	50.5	49.0	49.2	48.6	52.5	51.1
15–19	49.6	48.6	50.5	50.9	51.7	49.3	50.6
20–24	52.6	52.2	53.0	51.9	51.9	51.1	51.7
25–29	48.5	48.8	48.2	46.2	46.4	49.2	48.9
30–34	50.3	51.1	49.5	52.1	51.7	43.1	42.1
35–39	49.8	50.3	49.3	49.3	48.6	56.6	55.8
40–44	48.3	47.7	48.9	47.4	47.9	45.1	47.1
45–49	49.6	49.5	49.6	49.0	49.4	50.9	50.0
50–54	52.8	52.8	52.8	51.8	51.8	55.6	55.4
55–59	44.2	44.3	44.1	47.8	44.9	38.0	36.2
60–64	54.3	54.3	54.4	52.2	52.1	59.9	62.2
65–69	46.8	46.8	46.7	47.7	47.9	43.4	41.7
70–74	50.0	50.2	49.8	50.7	50.1	51.2	54.2
75–79	43.4	43.1	43.7	44.8	45.3	40.1	39.0
80–84	43.5	42.0	45.1	44.1	45.0	50.8	55.7
85–89	33.1	31.6	34.4	33.4	35.3	32.3	31.3
90–94	29.2	27.2	30.9	25.9	27.2	47.9	51.8

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PERCENTAGE RELATION BETWEEN THE NUMBER REPORTED IN EACH SPECIFIED AGE GROUP AND THE NUMBER REPORTED IN THE TWO NEIGHBORING AGE GROUPS, WHEN THE MEDIAN YEAR OF EACH GROUP IS A YEAR OF CONCENTRATION.

[*Method II.*]

Age Groups.	Aggregate Population.			Native White.		Colored.	
	Total.	Male.	Female.	Total.	Female.	Total.	Female.
8–12	49.2	49.6	48.8	48.3	48.0	51.6	50.8
13–17	49.1	49.0	49.2	50.0	50.1	49.9	50.1
18–22	52.4	51.4	53.4	52.9	53.5	50.9	51.9
23–27	48.8	48.8	48.7	46.3	46.3	50.3	50.8
28–32	52.3	53.1	51.3	52.6	52.2	47.1	45.7
33–37	47.0	47.5	46.5	48.3	47.7	45.4	44.7
38–42	52.1	51.9	52.2	49.9	49.8	58.3	60.2
43–47	46.2	45.9	46.4	46.8	47.4	39.8	39.3
48–52	53.5	52.9	54.1	51.0	51.7	64.6	66.4
53–57	46.9	47.6	46.1	48.7	47.8	37.6	34.2
58–62	49.7	49.0	50.4	47.4	47.7	58.3	63.1
63–67	50.4	51.0	49.8	51.5	51.4	42.8	39.6
68–72	48.6	48.4	48.7	48.4	48.1	54.6	58.8
73–77	45.3	45.2	45.4	47.3	47.6	37.8	36.6
78–82	44.5	43.8	45.1	44.6	44.7	54.0	58.6
83–87	37.3	35.2	39.3	38.9	41.4	32.0	31.6
88–92	31.0	29.8	32.1	28.3	29.2	51.2	53.7

PERCENTAGE RELATION BETWEEN THE NUMBER REPORTED IN EACH SPECIFIED AGE GROUP AND THE NUMBER REPORTED IN THE TWO NEIGHBORING AGE GROUPS, WHEN THE LAST YEAR OF EACH GROUP IS A YEAR OF CONCENTRATION.

[*Method III.*]

Age Groups.	Aggregate Population.			Native White.		Colored.	
	Total.	Male.	Female.	Total.	Female.	Total.	Female.
6–10	52.2	52.2	52.1	51.6	51.6	57.8	54.5
11–15	48.4	49.1	47.7	48.5	47.9	49.5	48.1
16–20	50.7	48.8	52.8	51.8	53.5	50.5	53.5
21–25	50.9	51.5	50.3	49.7	48.9	50.7	49.6
26–30	52.5	52.8	52.1	50.4	50.7	52.0	52.0
31–35	45.5	46.3	44.6	47.7	47.0	38.4	36.8
36–40	54.3	54.1	54.6	52.2	52.1	66.2	68.2
41–45	44.2	44.2	44.3	44.8	44.8	36.5	36.7
46–50	55.5	54.6	56.5	53.0	54.2	67.3	69.0
51–55	44.5	45.3	43.6	46.0	45.2	36.4	33.2
56–60	53.4	52.7	54.3	51.2	51.5	62.8	66.6
61–65	47.2	47.7	46.4	48.1	47.6	40.1	38.0
66–70	51.2	50.6	51.8	50.4	50.9	56.5	59.0
71–75	44.8	45.4	44.1	47.1	46.4	37.7	37.1
76–80	47.5	46.6	48.5	47.3	48.0	55.9	59.0
81–85	37.1	36.0	38.2	39.6	40.9	30.8	31.1
86–90	37.9	35.9	39.7	35.2	37.1	56.8	58.5

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Considering the results for the total aggregate population, it appears that by each method of grouping, in the period of middle age, there is an excess in every group containing a year which is a multiple of 10, with the exception of the group 40-44. In the following tables the expression obtained for the numerical values of the groups containing multiples of 10 and of the groups containing odd multiples of 5 are placed in parallel columns. The groups used contain the years of concentration from 20 to 55: —

RELATIVE SIZES OF THE QUINQUENNIAL GROUPS FORMED FROM THE AGE RETURNS OF THE TOTAL AGGREGATE POPULATION BY THREE METHODS OF GROUPING.

Years of Concentration.	*Method I.*		*Method II.*		*Method III.*	
	Groups Containing Multiples of 10.	Groups Containing Multiples of 5.	Groups Containing Multiples of 10.	Groups Containing Multiples of 5.	Groups Containing Multiples of 10.	Groups Containing Multiples of 5.
20	52.6	....	52.4	....	50.7	....
25	....	48.5	....	48.8	....	50.9
30	50.3	....	52.3	....	52.5	....
35	...	49.8	....	47.0	....	45.5
40	48.3	....	52.1	....	54.3	....
45	....	49.6	....	46.2	....	44.2
50	52.8	....	53.5	....	55.5	....
55	....	44.2	....	46.9	....	44.5
Average	51.0	48.0	52.6	47.2	53.2	46.3

The difference between the average numerical values of the two kinds of groups shown in the foregoing table is, by Method I, 3.0; by Method II, 5.4; by Method III, 6.9. The following table shows the corresponding averages and differences for various classes of the population.

It appears from this table that the differences are uniformly smallest by Method I and largest by Method III. Remembering that these differences represent the relative inaccuracy of these different methods, we may conclude definitely that for the ages under consideration, *groups beginning with a*

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COMPARISON OF THE DIFFERENCES BETWEEN THE NUMBER OF REPORTED AGES IN QUINQUENNIAL GROUPS CONTAINING AN EVEN MULTIPLE OF 5 AND IN GROUPS CONTAINING AN ODD MULTIPLE OF 5, AS SHOWN BY THREE METHODS OF GROUPING.

Classes of Population.	Multiples of 5.	Method I.	Method II.	Method III.
Total aggregate.....	Even	51.0	52.6	53.2
	Odd	48.0	47.2	46.3
	Difference	3.0	5.4	6.9
Aggregate males.....	Even	51.0	52.3	52.6
	Odd	48.2	47.5	46.8
	Difference	2.8	4.8	5.8
Aggregate females....	Even	51.1	52.8	54.0
	Odd	47.8	46.9	45.7
	Difference	3.3	5.9	8.3
Total native white.....	Even	50.8	51.6	51.9
	Odd	48.1	47.5	47.1
	Difference	2.7	4.1	4.8
Native white females..	Even	50.8	51.8	52.6
	Odd	47.3	47.3	46.5
	Difference	3.5	4.4	6.1
Total colored	Even	48.7	55.2	59.0
	Odd	48.7	43.3	40.5
	Difference	0.0	11.9	18.5
Colored females.....	Even	48.6	58.5	60.7
	Odd	47.7	42.3	39.1
	Difference	0.9	16.2	21.6

year of concentration are more accurate than groups in which the year of concentration is the median or the last year. In

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other words, the tendency to return ages as less than the truth is much stronger than the tendency to return them as greater than the truth. The strength of this tendency varies greatly with the different classes of the population. This is shown by a comparison of the excess of the differences by Method III over the differences by Method I for different classes. This excess is least for the total native white (2.1) and greatest for the colored females (20.7). In general, the tables show that the tendency to report ages as less than the truth is stronger with females than with males and with the colored than with the white population.

An examination of the relative sizes of the differences for different classes of the population throws light on the question of the excessive concentration at 10-year intervals. This tendency to report ages at years which are even multiples of 5, rather than at odd multiples, is greater with females than with males and is greater with the aggregate population than with the native white population. The results of two methods of grouping indicate that it is stronger with the colored than with the white population. But by Method I the differences for the total colored and the colored females are only 0.0 and 0.9, respectively,—smaller than the corresponding differences for the native whites or the aggregate population. Reference to the table on page 32 shows that these low differences are due to the excessive size of the age group 35–39, as compared with the two neighboring age groups. The groups containing the year 35, formed by the two other methods of grouping, do not exhibit this peculiarity. On the other hand, there is a marked concentration in each group containing the year 40, except the group formed by Method I (40–44). It would appear that the four years below 40 (36–39) are excessively large as compared with the years above 40 (41–44). This is probably chargeable in part to a peculiar tendency on the part of those whose ages are greater than 40, to return themselves as less than 40. It

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would seem also that the concentration on the year 40 is drawn in but very slight degree from years less than 40. This peculiarity, especially noticeable with respect to the colored population, is also traceable in the returns from the native whites and the aggregate population.

In the light of the foregoing explanation of the only part of the table that seems to be contradictory, we may conclude that the tendency to concentrate on the even, rather than on the odd multiples of 5, is much stronger with the colored than with the white population.

It should be noticed that the figures which have been presented do not afford a basis for determining the percentage of inaccuracy of any age group or method of age grouping. The method used is valid only for comparative purposes. Neither is it practicable to apply this method to other than quinquennial groups, as its basis is the excess of concentration on the even multiples of 5 over that on the odd multiples of 5. A decennial group, for example, must contain both an even and an odd multiple of 5, and a series of such groups cannot be studied to advantage by this method. The conclusions which have been reached as to the direction of concentration would seem to have some bearing on the question of the relative accuracy of various forms of decennial age groups.

The method used has another limitation in being applicable to the study of only a portion of the age table. Above 60 years the increase of the death rate is so rapid that a study of the comparative sizes of age groups can hardly lead to trustworthy conclusions. But this part of the population is comparatively small and, from an economic standpoint, comparatively unimportant. It seems probable, however, that the generally accepted opinion, that persons advanced in years very commonly overstate their ages, is entirely correct. In the early years of life also there are rapid changes of the death rate. As the age returns show no marked con-

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centration on multiples of 5 below 20, it has been thought best in this study to disregard these lower ages.

Summary of Conclusions.

1. More persons return themselves as younger than they are than as older than they are. This is true for both sexes and for all classes of the population. This tendency is strongest in the colored population and is least marked in the native white population. For all classes the tendency is more noticeable in women than in men.

2. On account of the tendency to report ages as less than the truth the years of concentration are preferably placed at the beginning of the quinquennial groups.

3. A number of persons who are over 40 years old report themselves as under 40. This is true for all classes, but is especially noticeable with the colored population. It also seems probable that very few persons less than 40 years old report themselves as 40.

4. The results of this study throw some light on the question of the relative desirability of a quinquennial or some other system of grouping. The English census of 1891 used decennial groups, explaining that "if ages be grouped by given quinquennial periods the figures for the successive quinquennia are too high or too low, accordingly as they include or do not include a year that is an exact multiple of 10. Therefore . . . it is better for such purposes as require accuracy . . . to make use preferentially of decennial periods, and to arrange them in such a way that the year which is a multiple of 10 shall come in the middle of the period; that is to say, to use such age periods as 25–35, 35–45, etc., rather than 30–40, 40–50, etc." *

It has been shown that the accuracy of a series of quinquennial groups depends very largely on the form of group used. It does not seem that the inaccuracy of the form of

* *Census of England and Wales*, 1891, General Report, p. 27.

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quinquennial groups used in the United States census is sufficient to warrant the substitution of the less convenient decennial groups. The choice of the form of decennial group used in the English census was evidently made on the assumption that the wrongly reported ages are drawn equally from above and below the year of concentration. It has been shown that, for the United States at least, this assumption has no basis in fact. There is room for considerable doubt as to whether the decennial groups used in the English census are more accurate than the quinquennial groups used in the United States census.

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AIDS IN THE USE OF GOVERNMENT PUBLICATIONS.

By Lucius Page Lane, S.B., A.M.,

Assistant, Department of Documents and Statistics, Public Library, Boston, Mass.

The largest publishing concern in America is the United States government, the output of the government printing office amounting in a single year to more than a thousand distinct items. These issues are, however, less appropriately distributed and less convenient for consultation than almost any other kind of printed matter that is manufactured. These facts have been frequently pointed out by those who have had to do with public documents, and there have been some improvements in the government's methods in recent years. Much remains to be striven for, but the object of this paper is to show the present situation and to point out what helps may be made use of by those who consult government publications.

A great many government issues are, of course, official reports of the work done by the various bureaus and divisions of the departments, having the same place among government publications that reports of institutions or stock companies have among the issues of private publishers. These are of interest only to students of administration and investigators of special topics, save as it is the duty of every citizen to exercise a close oversight over his servant, the Government. Moreover, as in every report intended to show amount of work accomplished and the existing condition of a business, it is chiefly in these annual departmental reports, with the appendices, that the original and detailed statistical statements are to be found, likely to be of particular interest to the readers of this paper. The investigator's ability to find the information he desires in the departmental reports will depend largely upon his knowledge of the organization of

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the government, of the different bureaus and divisions which exist, the duties performed by each, and the department to which each is subordinate. As there are constant changes in names, affiliations, and assignments of duties, from year to year, and as there are some confusing similarities or identities of name and duties between analogous offices of different departments, it will probably be desirable to gain a general view or refresh one's memory as to these matters by the preliminary step of going carefully through those pages of the latest congressional directory* which describe the organization of the executive departments, their sub-divisions, and duties. It will be well also to glance through the list of chiefs of divisions and sections, as this list will hint more systematically and specifically at the kind of matter that may be looked for in each departmental report. It would serve a useful purpose also to examine in the last annual report of the public printer the list of documents printed upon requisitions of heads of executive departments.

The official annual reports of the subordinate offices are included as appendices in the complete editions of the reports of the heads of the several executive departments,— the members of the Cabinet. There are a few cases only in which the separate edition of the report of the subordinate office contains matter not included in the report when it appears as an appendix to the annual report of the head of the department. There are, however, four permanent branches of the government of which the heads, although not members of the Cabinet, report directly to the President, and are not subordinate to any of the executive departments,— the Department of Labor, the Commission of Fish and Fisheries, the Civil Service Commission, and the Interstate Commerce Commission, from each of which there come one or more volumes of annual reports every year. It should be noted that the annual reports of the members of the Cabinet are

* To be procured of the Superintendent of Documents, 35 cents (cloth).

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also issued in an earlier, separate form, without the appendices, even though the title pages of the preliminary pamphlet and the final bulky volume may be precisely the same, so that, for example, in calling for the latest report of the Secretary of the Treasury upon the state of the finances, at a library or elsewhere, one may not be sure whether he will receive the volume of 800 pages or more, including the desired statistical tables, or a pamphlet of 150 pages. Furthermore, there are at least two editions of the departmental report in the complete form,—the "departmental edition,"—issued upon requisition of the head of the department for its use, unbound or bound in cloth in one or more volumes, and the congressional edition, issued in the "public documents" or "sheep-bound" set, for the use of members of Congress and distribution by the superintendent of documents under the direction of Congress to "designated depository" libraries throughout the country. (Strictly or technically speaking, only the congressional editions are "public documents"; the other issues are "government publications" not "public documents.")

In the congressional series the departmental reports usually appear as transmitted to Congress by the President, and are "executive documents." All the public documents of each session of each Congress are divided into Senate and House documents and reports. The departmental reports in each case are executive documents, being thus distinguished from the miscellaneous documents (or communications made to Congress from other sources than through the President or from its own committees) and reports (of committees to the Senate or House, or both). This distinction has not always been carefully observed, and the arrangements and designation have varied somewhat in former years. The distinction between executive and miscellaneous documents is dropped in the public documents of the 54th Congress (December, 1895), and since then all the documents are put

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in four groups,— Senate documents, Senate reports, House documents, House reports.

As messages from the President transmitting reports from executive offices are sent to both houses simultaneously, it was formerly the case that the same report would appear twice in the documents of a session, once as a Senate executive document, and once as a House executive document. Since 1858, however, it has been customary for the public printer, who assigns the numbers to documents in the order in which the manuscript for each reaches him, to print the document as Senate or House according to which copy reaches him first, and to omit the other. There is an increasing tendency towards system and uniformity, however, and for recent years the same document will generally be found in about the same place each year.

I take so much time to explain the nature and arrangement of the public documents, or "sheep-bound" set, because it is in this set that a fairly complete collection of continuous files of government publications can most readily be found. As aforesaid, the set has of recent years been distributed to the depository libraries quite widely throughout the country. The depository libraries have included many of such meagre capacity that the public documents have been more of a burden than a boon to them, and have been packed away in disorder in garret or cellar in spite of the condition imposed by law that depositories must grant to the public free access to the documents. A list of the depositories may be found in the annual report of the superintendent of documents, which is both issued separately and included in the report of the public printer.

As the congressional directory will serve as an indicator of the scope and nature of the executive documents, all of which will be included in the public documents, the great guide book to the contents of the whole public documents series is the government *Checklist*. The first edition of this

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was compiled by John G. Ames, then superintendent of documents in the Department of the Interior, 1892. The second edition, constructed on the same plan, much enlarged and improved, was issued in 1895, by F. A. Crandall, Doctor Ames' successor as superintendent of documents, when that position was transferred from the Department of the Interior to the government printing office, and came under the direction of the public printer, who is an agent of Congress directly responsible to it through the joint committee on printing. Doctor Ames remained clerk in charge of documents in the Interior Department, and stills prepares an annual report which is printed regarding the receipt, distribution, and sale of public documents by that department. The present superintendent of documents, L. C. Ferrell, Mr. Crandall's successor, in his annual report recently issued, promises a third and still further improved and enlarged edition of the *Checklist*, with many important additions. In an official letter since the report was published, dated February 13, 1900, he says that this new edition may not be expected for a year. The first and second editions are unfortunately out of print, and sad to relate, the *Checklist* cannot be found in the public documents themselves, never having been issued as a congressional document. It can, however, probably be found in every "designated depository" library.

The *Checklist* is not an alphabetical index to the contents of the public documents, but is a convenient octavo volume of 222 pages, of which the main part is as the name indicates a list of the volumes of the "sheep-bound" set, in the order in which they should be arranged upon the shelves in a library, that is, of all the volumes as far back as any ordinary library is likely to have the set, and as far as it was possible to make a fairly accurate inventory. There is nowhere in existence an approximately complete collection of United States government publications, nor anywhere a complete collection of even the public documents set. The larger,

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older libraries have the best sets, and there are probably better sets elsewhere than are to be found in any of the collections in Washington with the exception of that of the Department of State. The superintendent of documents is collecting a library of United States government publications, but lack of facilities prevents him from opening it for public use. The *Checklist* is chiefly valuable, however, for the appendices which it contains. The most important of these is a list of the principal annual reports that have been issued, with reference to the volumes in the congressional documents set where each may be found. The reference is by means of the "serial numbers" attached to the entries in the *Checklist* proper, which serve as volume numbers to the set as a whole. These begin with the documents of the 15th Congress and reached in the *Checklist* issued in 1895 to the number 3344, going through the 53rd Congress which ended in March, 1895. The volumes now issued have serial numbers gilded on their backs, in continuation of those assigned to the earlier volumes in the *Checklist*, greatly facilitating their arrangement on the shelves as they come, for they are issued very irregularly, some not being bound and distributed until three or four years after adjacent volumes. Second in importance in the *Checklist* is a list of catalogues and indexes published by the government which may be used in seeking information about government publications and their contents. It contains also inventories of the volumes issued of United States statutes and of the various series, "Annals of Congress," "Register of Debates," "Congressional Globe," and "Congressional Record," which record the debates in Congress, also of the Journals of the Senate and of the House of Representatives, which give the mere skeleton of the proceedings, but are the authoritative record of the votes; these are issued in the congressional documents set, and in the *Checklist* each is placed at the beginning of the documents of the chamber to which it

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refers, for each session, but some librarians keep the journals in a separate file and certain issues have failed to receive serial numbers. The *Checklist* describes also the important reprints of early documents known as American State Papers, and American Archives, and, in general, is the very best single guide for users of documents. The advent of the promised new addition is to be eagerly awaited.

Unfortunately, as has been already hinted, all government publications are not included in the congressional series or public documents proper. The whole mass of government publications may be classified according to their purpose as follows: —

I. Congressional documents. These are published by Congress (*a*) to aid it in the transaction of its legislative business and insure the preservation of authoritative records, or (*b*) to gratify the constituents of the several members. Under Class I (*a*) are: 1. Reports and papers from the executive departments already discussed; 2. Communications received by Congress, results of special investigations undertaken in accordance with its will, memorials, petitions, etc.; 3. Reports of congressional committees, standing and special, upon bills referred to them, etc. Under Class I (*b*) are documents intended to instruct and interest the people to whom they are distributed: 1. Information of practical value, such as the constituents would be willing to buy of private publishers, furnished free, however, to favored constituents through the public printing office and the franking privilege; 2. Memorials, petitions, and reports of societies and individuals which they are glad to have printed at the expense of the government. Of course the same document may serve two purposes.

II. Publications of the executive or judicial branches of the government. These are also either (*a*) intended to aid the officers of the government in the performance of their duties, or (*b*) to furnish the private citizen with information

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needed, either in his relations with the government or in the conduct of his private affairs for the betterment of his condition and the increase of the public weal. The largest number of government publications which never become public documents and do not reach libraries and private citizens belong in Class II (*a*). These include manuals and circulars containing information and instructions, such as rules of procedure, records of decisions, regulations to secure uniformity in practice in different places, practical manuals of methods, tactics, etc., information as to conditions and methods in similar work under other governments, and digests, reference lists, and compilations of various kinds. Some of these are transmitted to Congress and may be found in the public documents, and of late years any surplus copies of such works are turned over to the superintendent of documents for distribution to libraries or sale to private citizens. Many of these would be of great general interest and usefulness. Class II (*b*) includes: 1. Instructions for applicants or attorneys of applicants for patents, claims, pensions, copyrights, passports, admission to the civil service or to the naval or military academy, etc.; 2. Scientific, technical, and sociological monographs and reports, issued either by the institutions established expressly for the furtherance of such studies, such as the Smithsonian Institution, the Naval Observatory, and the Department of Labor, or by other offices created to promote certain definite practical interests, such as the Fish Commission, the Department of Agriculture, and the Bureau of Education, in connection with their work; 3. Popular treatises, intended to aid the farmer, merchant, or manufacturer in his business, or the student of social problems in getting at the facts, and thus to increase the general prosperity and accelerate the progress of the country. In this class would be included such issues as the invaluable "Annual Statistical Abstract of the United States," compiled in the Bureau of Statistics of the Treasury Department,

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an epitome of all the statistical information furnished by the various government bureaus (thus serving to indicate upon what subjects more full and detailed statements may be found), with additional matter, convenient in arrangement and size, furnishing all the statistical information the ordinary inquirer will desire.* Most of the monthly issues of the government also belong in this class, such as the monthly Consular reports, issued from the Bureau of Foreign Commerce of the Department of State, giving facts as to markets in foreign ports for the advice of merchants and manufacturers, and the Monthly summary of the commerce and finance of the United States, issued by the Bureau of Statistics of the Treasury Department, which serves to show bankers and merchants the exact condition of the country as regards exports and imports of money and goods month by month. Here also are to be classified such issues as the Department of Agriculture's Farmers' bulletins which are widely distributed.

Having now reviewed the general scope and nature of government publications we are prepared more intelligently to consider how the material contained in these multitudinous issues may be got at when it is wanted,—what indexes are available. The first great index to government publications is that compiled by Ben: Perley Poore, published in 1885, a monumental work of 1392 double-column pages of fine print in quarto size, purporting to be "A *descriptive catalogue* of the government publications of the United States, September 5, 1774, March 4, 1881." It appears in the congressional set as serial No. 2268 (48th Congress, 2d session, Senate misc. doc. No. 67). The main body of the work is a list of brief entries under subject heads in bold type, arranged, however, not by subjects, but in chronological order by date of publication. There is a subject and personal index at the end of the volume with references to pages where entries

* For sale by the Superintendent of Documents, 25 cents (paper).

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appear of publications issued upon the subject mentioned. To find the entries it is necessary to look through the whole page of fifty or more titles. Moreover, Mr. Poore did not succeed in including quite all the government publications of the period mentioned, and errors have crept in. However, this is the only means of finding obscure documents of unknown date, and we should be thankful that we have it. Note that it purports to cover all government publications, whether included in the congressional set or not. If it is known of any document desired that it was included in the congressional set, and if it is further known when it was issued, and whether it was House or Senate, and executive or miscellaneous, document, or report, it may be found in the appropriate index. For the congressional documents of each Congress until the 54th, December 2, 1895, there are six indexes for each session, one each for House executive documents, House miscellaneous documents, House reports, Senate executive documents, Senate miscellaneous documents, Senate reports. A copy of the index for the whole group to which it belonged was bound in each volume of the group, provided the volume was of the ordinary size. Since 1895, however, there have been issued "consolidated indexes," one for each session of Congress in a separate volume covering all the documents and reports of both Senate and House.

Poore's catalogue has been supplemented by Ames' "*Comprehensive Index* of the Publications of the United States Government, 1889–93," and by the catalogues of public documents issued by the superintendent of documents since 1895, of substantially the same character as Ames' work, with improvements of form, of which two issues have appeared covering the periods March 4, 1893, to June 30, 1895 (53d Congress), and July 1, 1895, to June 30, 1896 (54th Congress, 1st session), respectively. These three catalogues are models of excellence in clearness, completeness, and accuracy. The two latter are strictly alphabetical,

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including both subject and author entries in a single alphabet, give fairly full titles, and include all the different editions issued of each work. It will be noticed that the interval between Poore and Ames, 1881–89, is not covered. A catalogue to fill the hiatus has been ordered by Congress and is in course of preparation. (Joint resolution, March 3, 1897.)

The catalogues and indexes thus far mentioned are the primary sources of general information regarding United States government publications. In connection with them the monthly catalogue of United States public documents, issued by the superintendent of documents, must be noticed. This began January, 1895, and was preceded by Hickcox's United States government publications, monthly catalogue,—a private enterprise, conducted from 1885–94. The monthly catalogue as now issued includes a complete list of all United States government publications, month by month, including reprints and various editions, arranged by the branch, department, bureau or division of issue, with statement of price if obtainable by purchase from the superintendent of documents. Each number of the catalogue has an excellent index, so that this publication serves as a guide to documents issued too recently to appear in any of the previously mentioned catalogues or indexes. Unfortunately, the edition of the monthly catalogue is so limited that it is difficult for private individuals to obtain it. The public documents bill that has been submitted by the public printer for consideration of the present Congress provides that additional copies may be printed for private subscribers at sixty cents per annum, and in his last annual report the superintendent of documents announces a plan of making the index of the monthly catalogue "cumulative." If this can be done, and the proposed bill becomes a law, the condition of affairs as regards government publications will be immensely improved and will begin to approach the ideal state. The bill includes also a provision to insure the des-

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ignated depositories receiving all government publications, whether congressional documents or not. At present the libraries receive only such of the latter class as are furnished to the superintendent of documents for distribution to them, or such as they receive by special favor directly from the office of authorship or publication, and they fail to receive many issues. No effort should be spared that may help to gain the passage of the bill. A copy of it may be found in the *Library Journal* for February, 1900, pp. 65–67.

When by means of the helps thus far mentioned the investigator has found out what government publications have been issued, bearing upon or likely to contain information bearing upon the subject that interests him, and when and from what office these documents have appeared, it will remain to select from among the multitude of titles a few to be first looked up. For this purpose some of the special catalogues or indexes issued by the various departments may be needed. As aforesaid, a list of these is given in the government *Checklist.* I append to this paper for convenience a list of reference books mentioned and some other aids, and also of a few of the more important government indexes and lists which have appeared since the *Checklist* was compiled.

The publications of the various States are quite as perplexing, in proportion to their number, as those of the United States. The best source of information concerning them will be the "provisional list," entitled "State publications," issued from the office of the *Publishers' Weekly*,* of which Part I: New England States, has already appeared. This may be supplemented by some of the publications of some of the State libraries, as the State libraries have a practice of exchanging the publications of their respective States with each other, and hence have more complete sets of them than libraries of other kinds. The annual supplement to the catalogue of the Massachusetts State library, issued in

* New York.

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connection with the annual report of the librarian, is particularly good, as it is strictly alphabetical.

When the exact volume wanted is precisely known, there still remains one more thing to be achieved by the inquirer, namely, to lay hands on a copy of the document! When that is done, the struggle is probably over, for government publications are fairly well provided with individual tables of contents and indexes. But to lay hands on a copy of the document may not be so easy as it would seem that it should be. In the first place, as aforesaid, no library has received all government publications. In the second place, if the document wanted is not in the congressional set, it remains to be discovered where in the library it is kept, if the library has it. Perhaps a few words on the cataloguing of goverment publications not included in the "sheep-bound" set may be in place here. Most American libraries have card catalogues which are the chief guides to their contents. For ordinary books this catalogue usually meets the need of inquirers admirably with its entry under author, subject, or title. Goverment publications, however, are peculiar in that author and title entries for these are of little or no use in helping searchers to find them, and the assignment of appropriate subject entries is often very difficult. Librarians have directed much discussion to this problem, but it still remains perplexing. An especially unfortunate thing is that some of the oldest and largest libraries, which have the most nearly complete collections of documents, are the worst off as to catalogues of them, for these two reasons: First, having commenced their work before the development of carefully adapted methods their system of cataloguing is inferior, as they have felt constrained for consistency's sake to continue the old method; second, because of the great size of their collections they have deemed it impracticable not only to alter their system, as that would entail going over again an immense extent of ground, but even, because of their multi-

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tude, to catalogue the currently received documents with the great care and fulness necessary to make them entirely available. This is notably the case, especially in the former respect, in the Boston public library, which has probably one of the most complete collections of United States government publications, but where the card catalogue, in so far as these publications is concerned, is desperately bad. It is an almost hopeless undertaking for anyone not familiar with the practice of the library to attempt to find any government publication in the card catalogue, and even the members of the staff sometimes despair as to particular kinds of documents. Although the catalogue is otherwise constructed throughout upon the dictionary or alphabetical plan, under names of countries there are *three* different sets or files of cards, each file arranged independently, and the cards of the first group are arranged not alphabetically, but "hierarchically." If a searcher has studied the *Handbook for Readers* carefully, and is familiar with the organization and relations of the departments of the government and their subdivisions, he may be able to make use of the catalogue. Otherwise he would do better to ask an attendant to consult it for him without delay. The old printed catalogue and supplement include an index to the congressional documents, and this was continued in manuscript on slips for a long time afterwards, but was finally abandoned and is now inaccessible.

Furthermore, cataloguers are apt to imagine that there is a legitimate name for each government subdivision which must be used as in the case of individuals and incorporated bodies. In fact, this is not the case, and for government-author entries such names as seem most likely to be permanently serviceable should be arbitrarily adopted, and when adopted should be pertinaciously adhered to, with "*See*" references to the form adopted from the various names that the publications of the bureau appear under. The Boston public library is a flagrant offender in this matter of attempt-

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ing to follow all the vagaries of name of different bureaus and of the same bureau at different periods. Libraries probably could not do better than to adopt as models in their cataloguing of government publications the methods used in the latest issues of the *Comprehensive Catalogue*, issued by the superintendent of documents, described above, especially adopting for headings the forms of names of government bureaus as authors given in the list appended at the end of each volume. That is, the names of government bureaus as authors should be so inverted that the entries will be arranged in the alphabetical file of cards by the most significant word in the name, as suggested in Linderfelt's rules, §180, not by some such insignificant word as Board, Department, Bureau, Division, Commission, etc., and the same name should always be used for the same bureau, even though it may appear under different names on the title pages of different publications according to the whims of the successive chiefs.

Finally, these headings, thus adopted, should be thrown into a single alphabet under the name of the country, along with the subject entries for the country, so that there will be but one possible place for any given entry.

SELECT LIST.

PRINCIPAL GUIDES.

U. S. Documents Office.

Checklist of public documents containing debates and proceedings of Congress from the first to the fifty-third Congress, together with miscellaneous lists of documents and historical and bibliographical notes. Second edition, revised and enlarged. Issued by F. A. Crandall, superintendent of documents, government printing office. Washington, 1895; 222 pp., 8vo.

Poore, Benjamin Perley.

A *descriptive catalogue* of the government publications of the United States, September 5, 1774–March 4, 1881. Washington, 1885; iv, 1392 pp., 4to.

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Ames, John Griffith.

Comprehensive index of the publications of the United States government, 1889–93. Washington, 1894; vi, 480 pp., 4to.

This covers the 51st and 52d Congresses. It contains (1) a list of titles, alphabetically arranged by subjects, with full information attached to each as to author and source of issue, (2) a personal index.

U. S. Documents Office.

Catalogue of the public documents of . . . Congress and of all departments of the government of the United States for the period March 4, 1893, to June 30, 1896 (being the "*Comprehensive index*" provided for by the act approved January 12, 1895). Prepared under the supervision of the superintendent of documents, government printing office. Washington, 1896, 1898; 2v. 4to.

Contents: 53d Congress; 54th Congress, 1st session.

U. S. Documents Office.

Catalogue of United States public documents. Issued *monthly* by the superintendent of documents, government printing office. No. 1–60. January, 1895–December, 1899. Washington, 1895–99; 5v. 8vo.

For 1900, the index of each monthly issue covers all previous numbers of this year.

U. S. Documents Office.

Index to the subjects of the documents and reports and to the committees, senators, and representatives presenting them, with tables of the same in numerical order (being the "*Consolidated index*" provided for by the act of January 12, 1895). Compiled under the direction of the superintendent of documents, 54th Congress, 1st session–55th Congress, 3d session; December 2, 1895–March 4, 1899. Washington, 1897–1900; 5v. 8vo.

SPECIAL GOVERNMENT LISTS ISSUED SINCE THOSE INCLUDED IN THE CHECKLIST OF 1895.

[Hasse, Adelheid Rosalia.]

List of publications of the U. S. Department of Agriculture from 1841 to June 30, 1895, inclusive. Washington, 1896; 76 pp. [Department of agriculture. Library. Bulletin. 9.] 8vo.

This is already out-of-date on account of the extreme fecundity in printed matter of the department.

U. S. Publications Division. (Agriculture Department.)

Index to the annual reports of the U. S. Department of Agriculture for the years 1837 to 1893, inclusive. Washington, 1896; 252 pp., 8vo.

This constitutes Bulletin 1 of the Department of agriculture Division of publications.

Thompson, George Fayette.

Synoptical index to the reports of the statistician [of the Depart-

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ment of agriculture] 1863 to 1894. Washington, 1897; 258 pp. [Department of agriculture. Division of publications. Bulletin. 2.] 8vo.

Thompson, George Fayette.

Index to authors with titles of their publications appearing in the documents of the U. S. Department of agriculture, 1841 to 1897. Washington, 1898; 303 pp. [Department of agriculture. Division of publications. Bulletin. 4.] 8vo.

U. S. Coast and Geodetic Survey. (Treasury Department.)

Bibliography. Descriptive catalogue of publications relating to the U. S. Coast and geodetic survey, 1807 to 1896 . . . Washington, 1898; 118 pp. [Special publication. 2.] 8vo.

U. S. Documents Office.

Bibliography of United States public documents relating to interoceanic communication across Nicaragua, Isthmus of Panama, Isthmus of Tehuantepec, etc. Prepared in the office of the superintendent of documents, government printing office. Washington, 1899; 29 pp., 8vo.

U. S. Documents Office.

Price list of U. S. public documents for sale by the superintendent of documents, government printing office, Union building, Washington, D. C. Third edition. May 1, 1900. Washington, 1900; 142 pp., 8vo.

U. S. Experiments Stations Office. (Agricultural Department.)

List of publications of the office of experiment stations and the several stations. (In its Bulletin. 80. Washington, 1900; pp. 508–623.)

OTHER SOURCES OF INFORMATION.

1. OFFICIAL.

Ames, John Griffith.

Special report relative to public documents. Washington, 1894; 19 pp. [Superintendent of documents, Department of the Interior.] 8vo.

A complete, clear, and vigorous statement of then existing conditions and plea for needed reforms.

U. S. Government Printing Office.

Annual report of the public printer for the year ending June 30, 1894–99. Washington, 1895–99; 6v. 8vo.

This includes the report of the superintendent of documents. The report gives lists of documents printed for Congress and upon requisition from the heads of departments, with the cost, size of editions, etc., lists of "designated" and other depository libraries, and much other information.

U. S. Documents Office.

Annual report, 1st, 2d, 4th, 5th, of the superintendent of documents for the fiscal year ended June 30, 1895, '96, '98, '99.

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Washington, 1895–1900; 4 pph. [Government printing office.] 8vo.

The 3d report, 1897, was not issued separately; it can be found in the report of the public printer for that year.

2. UNOFFICIAL.

Bowker, Richard Rogers.

United States government publications. (Library journal. New York, 1885; vol. 10, pp. 236–241.)

An enlightening historical and descriptive sketch with references to catalogues and indexes.

Channing, Edward, and Albert Bushnell Hart.

Indexes to public documents, 1776–1895. (In their Guide to the study of American history. Boston, 1896; pp. 38–39.)

This claims to be "a nearly complete list of aids."

Ford, Paul Leicester.

Some materials for a bibliography of the official publications of the Continental Congress, 1774–89. Boston, 1890; 31 pp. [Boston. Public Library. Bibliographies of special subjects. 6.] 8vo.

This indicates in what libraries documents mentioned may be found.

Greely, Adolphus Washington.

Public documents of the early Congresses. Washington, 1897; (1) 1109–1248 pp., 8vo.

Reprinted from the annual report of the American Historical Association for 1896, vol. 1. An essay with bibliographical lists appended, including a list of indexes of public documents.

Hasse, Adelheid Rosalia.

The nation's records. (Forum. New York, 1898; vol. 25, pp. 598–602.)

A clear and forceful presentation of the deplorable failure of the United States to preserve, collect, or arrange its official records.

Hickcox, John Howard.

Serial, technical, and scientific publications of the government. (Library journal. New York, 1897; vol. 22, pp. 16–17.)

This mentions 104 publications not issued as Congressional documents.

Macdonald, William.

Bibliographical note. (In his Select documents illustrative of the history of the United States, 1776–1861. New York, 1898; pp. xi–xiii.)

An excellent guide for historical students.

McKee, Thomas Hudson.

Note on the classes and printing of United States public documents. (Library journal. New York, 1885; vol. 10, pp. 241–244.)

Mr. McKee writes as clerk of the United States Senate document room and explains many perplexing matters.

Willoughby, William Franklin.

Statistical publications of the United States government. Philadelphia, 1891; 92–104 pp. [Publications of the American academy of political and social science. 35.] 8vo.

Reprinted from the Annals, vol. 1. A readable essay, not perfectly comprehensive.

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MISCELLANY AND NOTICES.

THE PAUPER ABSTRACT OF MASSACHUSETTS.

Twenty-first Annual Report of the State Board of Charity of Massachusetts. Boston. January, 1900.

The statistical tables appended to the last report of the Massachusetts State Board of Charity show some interesting improvements over the summaries published in previous volumes. The first table in the abstract contains as usual records of the sums spent for support and relief by each city and town, sub-divided according to the nature of the relief and the sort of institution concerned. An instructive new feature, however, is the column of figures showing the net amount of ordinary expense for pauper support and relief for the year ending March 31, 1899, per inhabitant, as given by the census of 1895, and the accompanying column which gives the rank of the cities and towns on the basis of this per capita expenditure. The variation is very wide,— from Gosnold which has no pauper expense, Windsor where the expense is .01 per capita, and Gill, Gay Head, Holland, and Littleton where it is .07, .12, .13, and .19, respectively,— up to Burlington where the per capita cost is $3.03, and Brewster, Yarmouth, Cohasset, and Halifax where the figures are $2.68, $2.58, $2.51, and $2.44. The averages by counties range from $0.82 in Middlesex to $1.72 in Nantucket, and $1.46 in Barnstable, the highest value for a county of considerable size; the average for the state is exactly $1.00.

The second table, giving the numbers of persons supported and relieved in the various cities and towns, is also improved by a calculation of average values, a column of figures being introduced to show the whole number of paupers, including vagrants, per 1000 inhabitants. Here the range is from Gay Head and Gosnold, where there were no paupers assisted during the year, and West Tisbury, Dover, Lincoln, and New Braintree where the numbers were 4.3, 4.5, 5.4, and 5.5 per 1000, respectively, up to Yarmouth with 84.6 paupers per 1000, Fall River with 84.1, and Marlboro, Woburn, and Chelsea

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where the corresponding figures are 82.7, 76.4, and 74.3, respectively. The figures for counties vary from 19.6 paupers per 1000 in Dukes, and 25.6 in Norfolk up to 53.7 in Bristol. The average for the state is 36.6 paupers per 1000 inhabitants. It is to be noted that in all these calculations the pauper statistics of 1898–99 are compared with the population for 1895, so that the absolute numbers are in most cases excessively high.

The third important innovation is in the third table of the report which concerns the treatment of the various classes of paupers in each city and town. In the *Twentieth Report* of the Board the number of children under 16, the number of idiotic persons and of insane persons were given, with the proportion of children cared for in almshouses. In the new report the total number of paupers is first divided into into the sane and the mentally defective, the former class being sub-divided into those under and over 16, the latter into the insane and the idiotic. Under each of the first two sub-classes the number of persons cared for in almshouses and in other institutions, those relieved in their own homes, and those boarded in other private families, is given. The mentally defective are divided into those cared for in almshouses, those treated in hospitals, asylums, and schools for the feeble-minded, and those boarded in private families. The general policy of each city and town in dealing with its pauper population is thus shown in a clear and comprehensive manner.

C.-E. A. WINSLOW.

ROUND NUMBERS.

The tendency of the maxima in any series of estimated numbers to collect about even numbers, or multiples of ten, or any round numbers which catch the attention of the unscientific observer has been pointed out in many instances. It shows itself most clearly perhaps in estimates of the ages of illiterate populations where maxima are always found at the ten-year periods. Dr. Edward D. Jones brought out some interesting points of this sort in connection with commercial statistics in these *Publications* for 1896 in a paper on "Round Numbers in Wages and Prices."

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Some such effect of the "personal equation" may be noted in the following table which is taken from Dr. Francis H. Herrick's invaluable monograph on "The American Lobster," published by the U. S. Fish Commission in the *Bulletin* for 1895. The figures showing the number of eggs in lobsters of various sizes are omitted, the numbers of lobsters of various sizes examined being alone of interest in this connection as showing the large apparent excess of lobsters whose length was in even inches over those whose length was in even half-inches, and the excess of the latter over the animals of intermediate size.

TABLE 15. (PAGE 51, "THE AMERICAN LOBSTER.")

Length of Lobster.	Number of Lobsters Examined.	Length of Lobster.	Number of Lobsters Examined.
Inches.		*Inches.*	
8	6	12 3-4	12
8 1-4	2	13	321
8 1-2	3	13 1-4	5
8 3-4	3	13 1-2	146
9	143	13 3-4	2
9 1-4	35	14	426
9 1-2	241	14 1-2	90
9 3-4	55	15	280
10	514	15 1-4	1
10 1-4	61	15 1-2	45
10 1-2	532	15 3-4	3
10 3-4	45	16	103
11	568	16 1-4	1
11 1-4	43	16 1-2	13
11 1-2	307	17	30
11 3-4	11	17 1-2	3
12	414	18	7
12 1-4	8	19	4
12 1-2	156		

C.-E. A. WINSLOW.

THE FATALITY OF CERTAIN DISEASES.

The following is taken from the *Boston Medical and Surgical Journal*, April 26, 1900: —

In consequence of the enactment of improved laws and regulations, and the better enforcement of laws which had long existed but had

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hitherto been neglected, the practice of notification of infectious diseases has made it possible to determine the fatality of such diseases with a considerable degree of accuracy. The application of these results gives a greater degree of certainty to the prognosis of disease.

It should be noted, however, that all percentages derived from statistics of this character are probably a little too high, since the registration of deaths as now conducted in the States and cities included in the list is more perfectly enforced than the notification of cases, many mild cases escaping notification, especially those of scarlet fever and measles.

The following extract comprises the substance of the returns to certain inquiries sent out by the United States Commissioners to the Paris Exposition of 1900, and compiled under their direction: *

In consequence of inquiries sent out in 1899 information was secured in regard to 619,765 reported cases of small-pox, typhoid fever, scarlet fever, diphtheria, and measles, which occurred in the years 1894, 1895, 1896, 1897, and 1898, together with 75,715 registered deaths from these diseases which occurred in the same years. These were reported by the following States and cities: —

STATES.†

Massachusetts,	1894-98	Vermont,	1896-97
Michigan,	1894-98	Connecticut,	1898
Rhode Island,	1894-98	Indiana,	1898

CITIES.

New York City,‡	1894-98	Reading,	1894-98
Chicago,	1894-98	Hudson Co., N. J.,	1894-98
Philadelphia,	1894-98	Cincinnati,	1894-97
Pittsburg,	1894-98	St. Louis,	1894-97
Cleveland,	1894-98	Baltimore,	1894-97
New Orleans,	1894-98	Milwaukee,	1895-97
Minneapolis,	1894-98	Rochester,	1894-97
St. Paul,	1894-98	Denver,	1894-96
Buffalo,	1894-98	San Francisco,	1898
Toledo,	1894-98		

The results of the returns received from the foregoing States and cities are as follows: —

* Public Hygiene and State Medicine in the United States, p. 21.

† The returns of several large cities (Boston, Worcester, Providence, Detroit, Hartford, New Haven, and Indianapolis) are included in the statistics of these States.

‡ Including the figures of the consolidated city for 1898.

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Diseases.	Reported Cases.	Registered Deaths.	Fatality (Per cent).
Small-pox	9,222	2,385	25.8
Typhoid fever	69,758	13,284	19.0
Diphtheria and croup	195,783	44,411	22.7
Scarlet fever	117,847	9,211	7.2
Measles	217,755	6,424	2.8
Total	619,765	75,715	

These results agree fairly well with those of the English Local Government Board for the eight years 1890–97, which showed a fatality for typhoid fever of 18.05 per cent, for diphtheria of 23 per cent, and for scarlet fever of 4.9 per cent.

In the compilation of these figures it was found necessary to reject the returns of several entire States and cities, in consequence of manifest deficiency in the number of reported cases.

The use of antitoxin for the treatment of diphtheria became general in the early months of 1895 throughout the country. If, therefore, the returns for the year 1894 be treated separately it appears that there were 25,844 reported cases, and 7654 deaths in that year, the fatality being 29.6 per cent, while the fatality of the remaining years was only 21.6 per cent.

Treating the year 1898 in the same manner, the fatality was only 20.5 per cent, or the ratio of 31,494 cases to 6471 deaths. In two States and seven cities combined, having a total population of 4,250,000, the fatality from diphtheria in 1894 was 29.7 per cent, and in the same places in 1898 it was only 14.6 per cent, confirming the statement that the diphtheria fatality has been cut in twain since the general introduction of antitoxin treatment. It is also quite noteworthy that in several large cities, situated a thousand miles apart, the diphtheria fatality before 1895 was quite uniformly from 29 to 30 per cent.

DANISH LABOR STATISTICS.

The *Nationalökonomisk Tidsskrift* (1ste Hefte, 1900) quotes figures from the *Statistiske Medelelser* of 1897 upon wages of agricultural

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servants and laborers in Denmark. These figures are made up from returns from 70 per cent of the farmers' associations, together with special reports from 150 employers of labor in agriculture or lumber industries.

The average pay for so-called agricultural servants is: —

	Men.	Women.
Summer pay, ...	$41.31	$23.49
Winter "	20.52	15.39

The cost of living is rated for men and women at 15.9 and 14.6 cents per diem, respectively. Wage figures vary considerably, those of a man's annual wage ranging from $55.35 to $68.85; wages also vary with the several classes of servants. Housemaids receive a little less than $74 per year, besides board; a farmer's head servant is paid as high as $121.50, besides board.

Servants' remuneration had risen in 1897, 14 per cent over 1892 and 80 per cent over the early seventies; corresponding figures for the rise of women's wages are 11 per cent and 103 per cent.

Regular day-laborers, living at their own cost, receive about $0.47 a day in spring and summer (110 days), $0.61 in autumn (40 days), and $0.37 in winter (150 days). Corresponding figures for those whose living is furnished them, are $0.32, $0.45, and $0.21. In the case of the regular laborers the year's pay is reckoned on the average (special labor being included) as $144.18; this figure becomes $93.15 when workmen are boarded. Temporary labor receives a slightly higher wage than does regular labor.

The Danish inspector of societies for aid in sickness reports their number as 902 at the end of 1898, of which 64 are located in Copenhagen, 73 in other cities, and 748 in the country.* The membership approaches 231,000; in the cities more than half of the members are men, while in the country the sexes are about equally represented. The property of these 902 societies, deducting debts, is valued at $513,000; the state contribution for 1898 brought this up to $702,000.

Income in 1898 was $594,000; in the country one-half of this income is derived from members, in Copenhagen one-fourth. Gifts, surpluses from fêtes, etc., play a great role in the country. Outlay

* *Nationalskonomisk Tidsskrift*, 1ste Hefte, 1900.

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amounted to about $540,000, of which 38 per cent was expended in financial aid for the sick, 35 per cent for medical attendance, and 12 per cent for medicine. In the cities, the percentage of expense for financial aid is from 40 to 45 per cent. The average annual expense per member is a little over $0.80 for medical attendance and about $0.55 for medicine.

Days of sickness per member (male and female) are given in the following table of averages; the figures are less for 1898 which was a remarkably good year: —

	Men.	Women.
In Copenhagen associations, ...	7.5	5.0
" country-town "	6.6	5.1
" island-district "	4.1	4.6
" Jylland "	3.3	4.1

Male members in the Copenhagen societies have assured themselves a daily wage during enforced idleness, as shown by the following table; they are in this respect more prudent than members of societies in smaller cities and in the country: —

Insured for less than 27 cents per day, ...	11.4 per cent
" " 27 cents per day, ...	39.0 " "
" " 27 to 54 cents per day, ...	30.7 " "
" " 54 cents per day, ...	18.3 " "
" " over 54 cents per day, ...	0.6 " "

Yale University.

A. G. KELLER.

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CONSTITUTION

OF THE

AMERICAN STATISTICAL ASSOCIATION.

ARTICLE I. This Association shall be denominated the AMERICAN STATISTICAL ASSOCIATION.

ART. II. The objects of the Association shall be to collect, preserve, and diffuse statistical information in the different departments of human knowledge.

ART. III. The Association shall be composed of Fellows and Honorary Members.

ART. IV. All members shall be chosen by the Board of Directors, the affirmative votes of four-fifths of the members of said Board being necessary to a choice. Each fellow shall pay annually two dollars or twenty dollars at some one time.

ART. V. Fellows only shall be entitled to vote, but Honorary Members shall have the right to sit and deliberate in all the meetings of the Association.

ART. VI. The officers of the Association shall be a President, five Vice-Presidents, a Recording Secretary, a Corresponding Secretary, a Treasurer, a Librarian, and three Counselors, who, together with the President and Secretaries, shall form a Board of Directors for the government of the institution, three of whom shall constitute a quorum at any meeting regularly convened. There shall be also three Standing Committees of three members each, namely, on Publication, on Finance, and on the Library.

ART. VII. The Association shall meet in the city of Boston, on the third Friday in January, April, and October, and at such other times as the Board of Directors shall appoint. At the annual meeting in January, the Association shall hear reports of the Board of Directors, of the Treasurer, of the Librarian, and of the Standing Committees, elect officers, and transact other business. Vacancies may be filled at any regular meeting. Five members shall be necessary to form a quorum for transacting business and the election of members, but a less number may adjourn the meeting.

ART. VIII. No alteration in this Constitution shall be made except on notice at a previous meeting, and by a vote of three fourths of the members present.

NOTE.— Each member shall be entitled to receive all reports and publications of the Association.

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I. THE REGISTRATION LAWS IN THE COLONIES OF MASSACHUSETTS BAY AND NEW PLYMOUTH. By Robert René Kuczynski, Ph.D.

II. TRAMPS AND WAYFARERS.

III. MISCELLANY AND NOTICES: Race Problems in Cuba, *William Z. Ripley;* Education of Women, *Alice Upton Pearmain;* Monthly Bulletin of the Statistics Department of Boston, *E. H. D.;* Statistics of Institutions, *C.-E. A. Winslow;* Census of Cuba, *D. R. D.;* English Census Taking, *E. H. D.;* Italian Immigration, *E. H. D.;* International Statistics, *E. H. D.;* Argentine Statistics, *F. S. Crum;* Bulletins of Labor Bureaus; Census Bulletins; Boards of Trade; General Remarks of the Gunshot Wounds of 1898 and 1899.

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CONTENTS.

I. The Registration Laws in the Colonies of Massachusetts Bay and New Plymouth. *By Robert René Kuczynski, Ph.D.* 65

II. Tramps and Wayfarers. 74

III. Miscellany and Notices: —

Race Problems in Cuba. *William Z. Ripley.* . . . 85

Education of Women. *Alice Upton Pearmain.* . . . 89

Monthly Bulletin of the Statistics Department of Boston. *E. H. D.* 94

Statistics of Institutions. *C.-E. A. Winslow.* 99

Census of Cuba. *D. R. D.* 101

English Census Taking. *E. H. D.* 102

Italian Immigration. *E. H. D.* 105

International Statistics. *E. H. D.* 107

Argentine Statistics. *F. S. Crum.* 109

Bulletins of Labor Bureaus. 111

Census Bulletins. 113

Boards of Trade. 114

General Remarks of the Gunshot Wounds of 1898 and 1898. 115

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AMERICAN

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NEW SERIES, No. 51. SEPTEMBER, 1900.

THE REGISTRATON LAWS IN THE COLONIES OF MASSACHUSETTS BAY AND NEW PLYMOUTH.

By Robert René Kuczynski, Ph.D., Washington, D. C.

The authorities of the Colony of Massachusetts Bay, soon after the settlement of the country, made official provision for a registration of births, marriages, and deaths. As early as 1639, ten years only after the founding of that colony, the general court, convened at Boston the 4th of September[1], ordered and decreed, five days later,[2] that "there be records kept of . . . . the days of every marriage, birth, and death of every person within this jurisdiction."[3] The fees, which the parties bringing the certificates had to pay the recorder for entry of the same, were stipulated to be one penny for every birth or death. The certificates were to be certified once

[1] *Records of the Governor and Company of the Massachusetts Bay in New England.* Boston, 1853, vol. i, p. 270.

[2] *Ibid.*, p. 271. "The Court was adjourned until the 9th at 3 o'clock."

[3] *Ibid.*, p. 275, *f.* "Whereas many judgments have bene given in our Courts, whereof no records are kept of the evidence and reasons whereupon the verdit and judgment did passe, the records wher of being duely entered and kept would be of good use for president to posterity, and a releife to such as shall have just cause to have their causes reheard and reveiwed, it is therefore by this Court ordered and decreed that hence forward every judgment, with all the evidence, bee recorded in a booke, to bee kept to posterity.

"Item: That there bee records kept of all wills, administrations, and inventories, as also of the dayes of every marriage, birth and death of every person within this jurisdiction."

Cf. (Dane, Prescott and Story) *Colony Laws.* Chapter 3.

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every year at the time of the general court, and it was provided that such towns as failed to send up their certificates should be fined forty shillings.[1]

The efficiency of this order appears to have been but slight. This, the authorities of the colony attributed apparently to want of zeal in the respective officers. Two methods were found to awaken their interest. On June 14, 1642, they allowed to the clerks of the writs, who then were the recorders, three pence for every record of birth or death, and to the recorder of the court they caused to be sent, with the transcript of the records, one penny for every entry. At the same time, they subjected the clerk of the writs to a penalty of twenty shillings for every neglect. In order to secure as complete a registration as possible from the date of the settlement, they likewise ordered that the recorders "shall do their utmost endeavor to find out in their several towns who has been born, and who has died, since the first founding of their towns and to record the same as aforesaid." It was added, that "the magistrates and other persons appointed to marry shall yearly deliver to the recorder of that court, that is nearest to the place of their habitation the names of such persons as they have married, with the days, months, and years of the same." It was also enacted that the recorders of the court "are faithfully and carefully to inrolle such births, deaths and marriages as shall thus be committed to their trust."[2]

The law of 1642 gives no indication of the method by which the clerk of the writs found out the births and deaths, especially those in the past. Special regulation in this regard was, apparently, committed to the different towns. It is interesting to see how one of the towns acted in this regard. On December 26, 1642, the Selectmen of Boston issued the following order: "It's ordered that parents shall give in a note of the names of their children, and the time of their birth, unto the clerk of the writs (both of such as

[1] *Records.* Vol. i, p. 276.
[2] *Records.* Boston, 1853; vol. ii, p. 15.

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have been born in this town, and shall be born) within one week after their birth, under the penalty of six pence for every defect, and he that has the care of the burying place, shall give notice unto the said clerk of the names of such as are buried, and that the constable shall signify this order unto every family in the town,"[1]

The authorities of the colony appear soon to have discovered their error in thinking that the defective records were the fault of the recorder, for as early as the 7th of March, 1644, it was ordered "that all parents, masters or servants, executors and administrators, respectively, shall stand charged to bring into the clerks of the writs the names of such, belonging to them, or any of them, as shall either be born or die, and that the new married man shall stand likewise bound to bring in a certificate of his marriage, under the hand of that magistrate, which married him, to the clerk of the writs." The fees to be paid were fixed at three pence for every entry. The sending of one penny for every record (stipulated in 1642 only for the births and deaths) was now required also in the case of marriages. It was ordered further that "if any person shall neglect to bring in a note, or certificate as aforesaid, together with three pence a name to the said clerk of the writs, to be recorded above one month after such birth, death or marriage, he shall then pay six pence to the said clerk; if he neglect two months, twelve pence; if three months, five shillings, which forfeits shall be returned into the treasury." Also, it was believed, "it were meet the grand juries were minded to present such defaulters as they take notice of against the intent of this order."[2]

This, I understand, is the way in which the development and improvement in the registration laws of the colony of Massachusetts Bay from 1639 to 1644 took place.[3]

[1] *Second Report of the Record Commissioners of the City of Boston.* 1877, p.71.

[2] *Records.* Vol. ii, p. 519.

[3] I do not agree with W. L. Sutton (*Second Annual Report to the General Assembly of Kentucky* relating to the registry and returns of births, marriages and deaths from Jan. 1, 1853, to Dec. 31, 1853, p. 138) and John S. Billings (John S. Billings, *The Registration of Vital Statistics* (*Annual Report of the National Board of Health*, 1882, pp. 355–461), p. 356, who make no distinction between the orders of 1639 and 1644. Neither seem to have knowledge of the law of 1643; and they give 1639 as the date of the entire legislation.

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In the next thirteen years after 1644 no law was made concerning registrations. We must take care, however, not to draw the conclusion that this was because of the correctness of the returns. The authorities who paid so much attention to registration that, on the 11th of November, 1647, they ordered "that forthwith there be, by direction of the auditor general, a strong press made of very firme oake planks, with rabit joyntes one into another . . ." "to the end all records, wills, births, letters, and other instruments which are of special and public concernment, may be safely preserved and improved for the good of present and succeeding ages,"[1] were compelled to enact a new law on the 6th of May, 1657, "taking into their consideration the great damage that will unavoidably accrue to the posterity of this commonwealth by the general neglect of observing the law enjoyning a record of all births, deaths, and marriages within this colony." In 1642, they saw the reason for the deficiency in the records in the want of zeal on the part of the clerks of the writs and of the recorder of the county; in 1644, they required notice under penalty from the respective heads of the family; now they tried to influence both parties. They ordered, "in case any person or persons shall neglect their duty required by the said law more than one month after any birth, death or marriage, the clerk of the writs shall demand the same, with twelve pence a name for his care and pains; and in case any shall refuse to satisfy him, he shall then return the names of such person or persons to the next magistrate or commissioner of the town where such persons dwell, who shall send for the party so refusing, and in case he shall persist therein, shall give order to the constable to levy the same." On the other hand, it was ordered, "if any clerk of the writs shall neglect his duty hereby injoyned him, he shall pay the following penalty: *i. e.*, for neglect of a yearly return to the County Court, five pounds; and for neglect of returning the

[1] *Records.* Vol. ii, p. 208.

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name of any person returnable by this law, whether born, married or died, more than thirty days before his return to the County Court, five shillings. And that no future neglect may be herein, the recorder of each County Court is hereby enjoyned from time to time to certify the County Courts, respectively, the names of all such clerks as shall neglect to make their yearly return according to this law, who, upon notice given, shall send for such clerk, and deal in the case according as law requires."[1]

This law was re-enacted at the revision of the laws in 1660.[2] It was re-enacted again, without amendment, in the revision of 1672.[3] There was no other law in the colony of Massachusetts Bay until consolidation, in 1692, of this colony with the colony of New Plymouth.

We shall now glance briefly at the registration legislation enacted by the pilgrims of New Plymouth.

It is very difficult, if not impossible, to fix exactly the beginning of this legislation in the colony of New Plymouth. The births, deaths, and marriages which, prior to the year 1647, were returned to the colonial secretary for record by the town clerks of the several municipalities under its jurisdiction have been lost by the decay of the first part of the original volume in which they were recorded at Plymouth.[4] Those of an earlier date, which were returned by the respective town clerks, and appear in the preserved part of the original volume, were undoubtedly returned after the year 1647. But there is one exception to be mentioned: the earliest marriages on record are entered among the court orders of the colony. The first is dated April 19, 1633.[5] But we do not know any law of so early a date on this

[1] *Records.* Vol. iv, Part I. Boston, 1854, p, 290. *Cf.* Vol. iii. Boston, 1854, p. 426 f.

[2] *The Colonial Laws of Massachusetts*, reprinted from the edition of 1660. Boston, 1889, p. 188.

[3] *The Colonial Laws of Massachusetts*, reprinted from the edition of 1872 Boston, 1890, p. 132. *Cf.* (Dane, Prescott and Story) *The Charters and General Laws of the Colony and Province of Massachusetts Bay.* Boston, 1814, p. 181 f.

[4] *Records of the Colony of New Plymouth in New England.* Miscellaneous Records, Boston, 185 f. Remarks.

[5] *Records of the Colony of New Plymouth in New England.* Court Orders, Vol. i. Boston, 1855, p. 13.

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subject. We seek without success in the "Compact" of Brugham,[1] who has collected all that is extant of what can properly be called the legislation of the first twelve years of the colony of Plymouth.[2] We find nothing more in the first revision of the laws on the 15th of October, 1636, which appears in the Plymouth colony records as of that date[3] and contains such of the laws passed in the first sixteen years of the colony as were retained at the revision.[4]

The first indication of the registration of the marriages is contained in the record of the court of assistants held the 7th of January, 1641. There, among "the fees of the Clerk of the Court allowed and agreed upon by the Court," we find "for recording of a marriage, six pence."[5] The first indication of general registration is dated four years later. At the general court, held at Plymouth the 3rd of March, 1645, the proposition was "confirmed" "that the clerk or some one in every town, do keep a register of the day and year of every marriage, birth, and burial, and to have three pence a piece for their pains."[6] On the 7th of July, 1646, the same was enacted as a law, but without the mention of the fees;[7] and it was re-enacted in 1658.[8] Lastly, on the 20th of October, 1646, the general court enacted a law, which was in force, with but few modifications, until the Plymouth colony came to an end.[9] This law resembles in many respects the law enacted in the colony of Massachusetts Bay, two and a half years before. It was provided "that every father or mother, or next in relation shall certify to the town clerk or register keeper the name and day of the birth of every child so born in his house within one month after it is born," "that every

[1] William Brugham, *The Compact with the Charter and Laws of the Colony of New Plymouth.* Boston, 1836.

[2] John Gordon Palfrey, *History of New England.* Vol. i. Boston, 1859, p. 340.

[3] *Record of the Colony of New Plymouth in New England.* Laws. Boston, 1861.

[4] W. J. Davis, *The New England States.* Vol. iii, p. 1742.

[5] *Plymouth Colony Records.* Court Orders, Vol. i, p. 169 f; Laws, p. 85 f, 161 f; Brugham, l. c. p. 109 f.

[6] *Plymouth Colony Records.* Court Orders, Vol. ii. Boston, 1855, p. 96.

[7] *Plymouth Colony Records.* Laws, p. 52; Brugham, l. c. p. 85.

[8] Brugham, l. c. p. 85.

[9] *Plymouth Colony Records.* Laws, p. 52 f, 189; Brugham, l. c. p. 86 f.

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person married shall signify his and her name with the day on which they were married unto the said clerk or register keeper within one month next after the day of his said marriage," "and also that every master or mistress of the family in which any person dies or person next in relation to any person so dead, shall give notice unto the said clerk or register keeper, the name of the person and the day of the said burial." There was, apparently, no fixed term within which the burial should be certified. At the revision of the law in June, 1671, however, the term of one month was stipulated for the notice of a death.[1] For every default, there was to be a penalty of three shillings, one half of which fine should be returned to the governor, the other to the clerk. The clerk was ordered to "exhibite a true and perfect copy fairely written annually at March Court unto the said Court of all the births, marriages, and burials of the year past." He was further required to "publish all contracts of marriages and have twelve pence for his fee for every marriage as he publishes orderly."[2] The fee of six pence provided in 1641 was then doubled. The order relating to the distribution of the fines was amended in 1658, so as to provide that one half of the fines should go to the colony instead of the governor.[3] These laws had so little effect, at least in the matter of the records of marriages, that in the printed laws voted by the court July, 1682, it was ordered "that such magistrate or other person authorized to join persons together in marriage, shall keep a register of the persons and time of their joining together and present a list thereof and present the same to the Court or town clerk of the said town."[4] The importance attributed by the authorities of the colony to the registration appears in the terms of the oath administered to every town clerk of each town; "enacted at the general

[1] Brugham, l. c. p. 271 f.
[2] *Cf.* p. 8, note 7.
[3] Brugham, l. c. p. 271 f.
[4] *Plymouth Colony Records.* Court Orders, Vol. vi. Boston, 1856, p. 121.

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Court of Election holden at Plymouth the 6th of June, 1654, . . . you shall record all births, marriages and burials, that shall be brought unto you within your town and shall publish all contracts of marriages you shall be required to do according to order of Court bearing date the twentieth day of October, 1646, so help you God who is the God of truth and punisher of falsehood."[1]

That a new colony, founded by immigrants in a wholly unknown country, should have ordered at the beginning a registration of the elements of vital statistics, would be of sufficient merit, from a statistical standpoint, to justify an exact investigation of the origin of its registration legislation. It will perhaps be objected that these immigrants went from a civilized country where for a century registration records had been kept: at all events the merit of the new colonies in this regard has not been noted in writings upon the subject. For example, Mr. W. L. Sutton, in his *Sketch of the History of Registration in the United States*, says: "It appears that immediately after the settlement of New England laws were enacted requiring a registration of births, marriages, and deaths, after the manner of the parochial registers of England, which doubtless the first settlers brought with them";[2] and John S. Billings, perhaps the best informed person on American registration laws, says: "The parochial registers of England were exceedingly imperfect. . . . Imperfect as it was, however, this was the system brought to America by the early settlers of New England."[3]

With a view to testing the truth of these statements, it will be well perhaps to compare the registration methods of England and Massachusetts at the middle of the 17th century, with particular regard for the following three points: (1) Who made the records? (2) What was recorded? (3) How was it recorded?

[1] *Plymouth Colony Records.* Laws, p. 107 f ; *cf. ibid.* p. 190. Court Orders, Vol. iii, p. 50 ; and Brugham, l. c. p. 116.

[2] *Op. cit.*, p. 138.

[3] *Op. cit.*, p 356.

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(1) We saw that in the colony of Massachusetts Bay, as well as in New Plymouth, the records were made by government clerks. The registration made in England was ecclesiastical, it being the duty of the officiating minister to keep the register.

(2) In Massachusetts, the births, deaths, and marriages were recorded; in England, the baptisms, burials, and weddings. "The founders of the Massachusetts colony . . . had the wisdom to perceive that it was more important for the civil government to preserve exact records of the dates of births and deaths, than of religious ceremonies . . ." [1]

(3) In Massachusetts, every person was required to give notice to the government officers of any births, deaths, and marriages in his family; in England the records were kept simply by the officiating ministers.

On all three points, then, the system employed in Massachusetts was wholly different from the system in use in the mother country. Did, then, the authorities of the colonies find their model in another country? I am inclined to think they did not.

Massachusetts was the first state in the Christian world which recorded births, deaths, and marriages by government officers; Massachusetts was the first state in the world which recorded the dates of the actual facts of births, deaths, and marriages rather than the subsequent ecclesiastical ceremonies of baptisms, burials, and weddings; and Massachusetts was the first state in the world which imposed on the citizen the duty of giving notice to the government of all births, beaths, and marriages occurring in his family.

[1] *Reports of Cases Argued and Determined in the Supreme Judicial Court of Massachusetts.* By Charles Allen. Vol. x, p. 164.

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TRAMPS AND WAYFARERS.

The following paper is a report of a Committee of the Massachusetts Association of Relief Officers, read at a meeting, held November 14, 1900. While it concerns local experience, the investigation, both as to method and results, has a general interest and application. It is one of the few accurate studies of administrative practice in the United State.

In the *Report of the State Board of Charity* for 1899, on page xxviii, as a small portion of a small foot-note to the Pauper Abstract, occur these words: "The cases of vagrancy numbered 207,081, and cost the public a direct outlay of $25,843, besides increasing the expenses at almshouses by $7243," — a total of $33,086.

The dead weight of vagrancy which the State carries is not wholly measured even by these figures. Food is given to many of these men by hundreds of private families, and a certain number of petty offences are committed by them; occasionally more serious offences. No proof is needed that there *is* a dead weight, a burden that we wish to lighten. What are we now doing to check vagrancy, and what further steps can we take?

In the spring of 1899 a series of fifteen questions was sent to overseers of the poor throughout Massachusetts. Of these questions nine referred to the practice of the town in the treatment of tramps, and six to its opinion, based on experience, as to the best methods of dealing with them.

Answers were received from 184 cities and towns, representing about half the cities and towns in Massachusetts, which report more than 145,000 tramps housed during the year. This large number must not be understood to represent individuals. The use of the word "tramps" signifies the number of applications received from tramps and granted. It is possible that in some cases these may represent the

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same tramp 365 times in the year. The following tables were drawn from the answers sent.

In all the tables presented allowance must be made for possible errors arising from some ambiguity in the answers returned or from some misunderstanding on the part of the committee. It must also be understood that for convenience the word "town" often covers both cities and towns. All populations are quoted from the Census of 1895.

In the various towns, tramps are under the supervision of different departments or officials as follows: —

Overseers of poor	111 towns
Police	55 "
Constable	3 "
Selectmen	2 "
City marshal	1 "
Tramp officer	1 "
Highway department	1 "
By contract	1 "
	175 "
No tramps	7 "
Not specified	2 "
	184 "

The expense incurred is charged to: —

Poor department	123 towns
Police department	26 "
Special appropriation	4 "
Miscellaneous	3 "
No expense	8 "
Sent no report	9 "
Report "no tramps"	11 "
	184 "

Shelter is provided as follows: —

Police station	79 towns
Tramp house	40 "
Almshouse	36 "
Private families	12 "
Hotel	3 "
Wayfarers' Lodge	2 "
Town hall	1 "
Building in cemetery	1 "
	174 "
No lodgings provided	10 "
	184 "

Of these last, some are towns which have no applications from tramps and, therefore, need not consider the question.

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Food, as a rule, consists of crackers, or crackers with cheese, milk or tea, etc., and, in a minority of cases, in a good meal. On the other hand some places furnish no food at all.

Are they ever brought before the court?

6 towns say "yes"	109 say "no"
38 "occasionally"	8 report no experience with tramps, or do not answer.
9 "only on criminal charges"	117
7 "if repeaters"	67
7 "if unruly characters"	184
67	

With regard to requiring work of tramps: —

37 towns or cities exact work,
23 exact work at times or "when we have work to do,"
124 do not require it.
184

Most towns agree that such work is not profitable, and many declare that it costs more than it is worth. Others, however, say that the work offsets a portion of the expense, and believe it worth doing as it discourages tramps. The town of Sherborn says, "It had been the custom to house and feed all tramps applying for aid, and allow them to depart at 7 A.M. When the present Board of Overseers was elected, it was determined to put an end, as far as possible, to the tramp evil. From March, 1897, to March, 1898, we put up 1844 tramps. In April, 1898, we put them to work burying stone, grading, and fixing up around our new almshouse, and found the plan worked successfully, as we reduced the number to 167. In the winter they are provided with fuel but have to saw and split their own wood. Some are too lazy to do even this. The citizens have coöperated with the overseers and have refused demands for food, and have sent all applicants to the Almshouse. All deserving men going in search of work are aided and not detained more than an hour in the morning. We think we have solved the problem, and by utilizing their labor have saved the town some expense. If every town would only take advantage of the

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law requiring tramps to work, and would arrest and have convicted all those who break tools, the tramps would be forced to obtain employment."

The town of Canton believes that "the labor obtained during the year paid for its own expense, as they filled in a good many yards of low ground and made the place just so much better." The town of Norton believes that the labor will offset 25 to 40 per cent of the expense, and though it had in 1895 fewer than 2000 inhabitants, stands up to the work of lodging and feeding and exacting two hours' work from tramps at sawing wood, because, as they say, "If a town refuses proper accommodations it will add to the expense of contiguous towns."

More towns believe in the practice of exacting work, however, than are at present carrying out that plan. When asked if tramps should be compelled to work: —

165 say "yes"
8 say "no"
7 are doubtful
4 report no experience;
184

and when asked if all places should compel them to work, the answers are still different: —

138 yes
6 no
4 no experience
10 doubtful
26 "cities and large towns" or "where practicable."
184

It is easy to see that the discrepancy of these answers arises from the differing size and conditions of towns.

It appears to be the general opinion through the State that accommodations should be provided by all towns for tramps.

140 towns say "yes"
29 " say "no."
15 " have no tramps or fail to give their opinion.
184

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Another side of the question is with regard to bathing,—Should tramps be compelled to bathe before being fed? The answers to this question are necessarily qualified by the difficulty and expense to small towns in making provision for bathing: —[1]

89	towns	say "yes"
40	"	say "no"
7	"	are doubtful
27	"	"if convenient" or under certain circumstances
21	"	give no answer
184		

Is it desirable to have a uniform method of treatment?

148	towns	say "yes"
17	"	say "no"
19	"	no answer or a doubtful one
184		

We therefore see that almost all of the towns and cities furnish lodging of some sort to the homeless men who apply, with the exception of a few cities so placed that they may reasonably believe that the accommodations they refuse will be afforded by neighboring cities, and a few small towns that, having no accommodations for tramps, advise them to move on. About five out of six towns provide food of some sort; 8 cities and 50 towns exact work in some form, though in some cases only when they have work on hand.

We might expect to find that as a rule it would be the cities and large towns which would provide shelter and food *with work* for homeless men, but among 27 cities which have sent in reports, Boston, Lowell, Springfield, Brockton, and Newton are the only ones which invariably exact work, and Malden, Medford, and Beverly exact work when they have it. Three of these cities (Boston, Lowell, and Springfield) provide shelter other than the police station. There are, therefore, 50 *towns* which exact work (at all events

[1] Lanesborough and Wilmington think that if bathing were enforced smaller accommodations would be needed. Medway and Yarmouth think bathing useless unless clean clothing be provided. Waltham thinks they should be bathed if beds are provided. Monson thinks that they would generally need a night's soaking; and Chelmsford suggests anchoring them out all night. Palmer believes that "It would make some sick to take off all the dirt at once"; while Abington says, "Do you want to kill them?"

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when they have work to give), and, among these, 18 have less than 2000 inhabitants by the Census of 1895. Even the small towns of Bernardston, Middleton, Dunstable, and Marion, all having less than 1000 inhabitants in 1895, exact a regular stent of work from those to whom they give food and shelter. Marion says "Formerly we simply lodged and fed them and let them go. Since April 1st (1899) we worked them two hours breaking stone in the morning. Now we rarely have any except Saturdays, and, as we cannot work them Sunday mornings, we think seriously of obliging them to attend church. What does the Association advise?"

So much has been gathered from the answers relating to *facts* concerning treatment of homeless men. Briefly, we may say, that the cities and towns reporting have followed one or another of the five different lines of practice indicated under the following headings, and as a rule express satisfaction with the course pursued: —

1. Towns which feed, shelter, and systematically work tramps.

Among these Boston, as is well known, established the Wayfarers' Lodge in 1879. Springfield also adopted this plan in 1894, and reports number of tramps diminished from 15,000 to less than 1500 in 1899. Lowell says, "Since we have compelled them to work, they avoid us as much as possible." The town of Palmer says,— "We find, since we began to work them we only have about 500. When we did not work them, or if we did not, we would have 2500. One time last winter five or six tramps came in and the keeper told them they would have to break stone in the morning. 'Yes,' they said, 'we know that; they told us that before we left Philadelphia.'" A number of other towns explicitly state the proportionate reduction of numbers which they have made by exacting work.

2. Towns which shelter and feed, or shelter only, but make a practice of taking before court on second or third application, or posting the vagrant law, or warning to leave town.

Among these are Taunton, Fall River, and Worcester. Of the smaller towns which pursue this policy, Pepperell says,

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"After being overrun by tramps for years, the town left the question to the overseers of the poor and police who decided to enforce the tramp law. Notices were posted to the effect that we would put them up, but that they would be taken to court the next morning (exceptions made in case of weak, lame, etc., or in stormy weather). Little trouble since." And Greenfield states,— "Of the 56 cases during the year, 16 were let go on giving a good account of themselves, 40 were prosecuted (14 sent to State Farm, 26 to House of Correction). We used to be overrun with them, but since adopting this method they shun the town."

3. Towns which try to discourage by indirect means, usually by not giving food, or by placing tramp house far from centre of town.

Fitchburg says the plan of not feeding has reduced the number to one-half of what it was when they were fed. The experience of Holbrook is the same. Yarmouth refers them to almshouse, six miles away. Lanesborough says, "We made an arrangement with some person willing to accommodate the tramps and have found it a wise provision to have that person situated at a considerable distance from headquarters, so that the tramps must get considerable exercise after receiving the order before reaching their destination. This has doubtless cut down the number of applications materially." Wareham, after providing comfortable quarters, which the tramps soon made unfit for use, has now boarded up the windows of tramp house; and Hatfield says,— "We have a small building in cemetery where they are lodged. It is not a popular location, so they pass us by."

4. Towns which refuse to accommodate, except in stormy weather, or when applicants are sick or infirm.

Among these are Somerville, Everett, Chelsea, Natick, and Groton; the latter town says,— "We fed and lodged tramps till we had 400 to 600 a year, and decided to go out of business and refuse to entertain. Possibly during last year we put up 12 or 15 in cases of sickness or severe storms."

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5. Towns which shelter, feed, and do not work or arrest, except upon serious charges.

Under this heading are 6 cities and 59 towns, of which 20 have fewer than 1000 inhabitants. The small towns in the western part of the State have so few tramps that it appears to them a useless expense to make special provision for them. Seven of these towns report between them only 36 tramps during the year.

Of the groups of towns under these five headings, those under the first four headings are deterrent in their action, or mean to be deterrent.

Is it not a question whether the group under the fifth heading, which shelters, feeds, demands no work, nor arrests for vagrancy, does not, instead of putting up a barrier against tramping as a profession, rather instead make the road easy by supplying all the tramp needs or asks over-night, letting him go in the morning to get what he needs for the day's maintenance from the community?

Several cities and towns expressly say that they believe in leaving the whole question to the police,— among them Cambridge, Worcester, Taunton, and Fall River; but examination of the figures furnished by these and other cities gives reason to believe that what we may call the Wayfarers' Lodge policy, as illustrated by Boston and Springfield, tends more to reduce the number of tramps than the *apparently* more repressive course of placing the matter in the hands of the police. We may compare, for instance, Worcester, which lodges and feeds in the police station, with Springfield, which has a Wayfarers' Lodge. Worcester lodges its tramps in police station, gives crackers, no work, and keeps expense down to 1.4 cents apiece, the lowest stated expense; but while during the year Lowell has one tramp to every 44 inhabitants, Springfield one to 35, and Boston (the natural magnet to vagrancy in the State) one to 21, Worcester has one to every 9. Worcester reports 11,208 tramps during the year, very nearly half as many as Boston, a city of nearly five

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times its population; and it has more than seven times the number of tramps reported by Springfield, although it is not twice the size of Springfield.

This comparison is not made by way of proving the absolute superiority of the treatment by Wayfarers' Lodge and work. Too many elements enter into the question of the trend of vagrancy through cities and towns to allow of establishing proof of absolute success or failure of any kind of treatment; but the comparison may at least indicate that the question is not altogether settled in favor of police accommodation and the no-work policy by the low rate at which a town may provide for a tramp. If 11,208 pass through Worcester during the year, getting shelter and crackers and no enforced work, it is at least conceivable that Worcester householders give more meals at back doors than householders in Springfield are called on to give.

Again, take the three cities of Hampden County. Springfield, through its Wayfarers' Lodge, gives food and shelter and compels each able-bodied man to saw one-fourth cord of wood, not discharging until this is done. Holyoke and Chicopee both lodge in the police station; give no food, nor do they exact any work.

	Population.	*Number of Tramps in 1899.*	
Springfield,	51,522	1,472	1 to 35 of population
Holyoke,	40,322	3,132	1 " 13 " "
Chicopee,	16,420	2,540	1 " 6 " "

This would indicate that decent conditions with work are more discouraging to the tramp than shelter in the police station without either food or work.

In the *Report on the Subject of the Unemployed*, March 13, 1895, on page 15 of *Part II, Wayfarers and Tramps*, in evidence given by Chicopee, it is said that "in January, 1895, a rumor was printed in the Springfield newspaper that a wood-yard had been established here (Chicopee) where we should make the tramps work. The result was that whereas we had been having from 25 to 30 a-night, the number for the next week fell to an average of 6 to 8 a-night. Then

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they found that it was a hoax, and gradually reached their former numbers . . . Most of the old hobos give Springfield a wide berth, going straight through from Connecticut to Chicopee or Holyoke in a day, or stopping out at Westfield or Easthampton." [1]

If we compare the number of tramps in Chicopee and in Springfield as reported to the State Board of Charity for the last five years, we find that during these years Chicopee has had in all 13,802 tramps, Springfield 7818. Chicopee has reduced her yearly number from 2780, reported in 1896, to 1677 in 1900. Springfield has reduced 2258, reported in 1896, to 755, reported in 1900.

If tramps come into the State, they will get their food and shelter *somewhere*. If some towns give either or both without work, they will gravitate to those towns. When work is demanded for the accommodations given, there is a fair presumption that they will avoid those towns. There is the remoter possibility that if the practice widens and spreads, vagrancy may decrease throughout the State, — some men may graduate into decent self-supporting work, and younger men may be deterred from taking up vagrancy as a profession. Probably there will always be some in whom restlessness is inherent; but there would be at least the possibility of these taking to employments which offer variety and are in themselves irregular, becoming sailors, fishermen, etc.

Some of the towns which believe the matter should be left to the police, evidently believe that that course would be deterrent; while they believe that to place it with the overseers of the poor is too easy a method to employ with men who have no intention of working and who may be law-breakers. The answer to this would be that men recognized as vagrants or law-breakers should be arrested as vagrants, or under any statute which covers their offense, and the

[1] In 1894-95 the Commission on the Unemployed took evidence from 66 cities and towns, of whom 15 exacted work, either regularly or when they had it to give, a proportion of less than one-quarter. In 1899, out of 184 cities and towns, 58 exact work, either regularly or when they have it to give, a little less than one-third.

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co-operation of the police secured at that point. Lodging all wayfarers in the police station does not necessarily sift out the law-breakers or the men honestly out-of-work. The work-test, as used by either overseers of the poor or police, is more likely to do this and should be applied. The consideration of immediate cost which stands in the way of this course, or of arrest on necessary occasion, should be balanced with the cost to the community at large of acting as an open channel through which a current of vagrancy runs along unchecked.

In considering the question, we want to consider both the good of the community and of the individual who may be helped or who must be controlled. There is no kindness in making it easy for a man to tramp instead of trying to get regular work. No one who knows tramps will think it so. The sooner a man who is slipping into vagrancy can be made to realize that it is a way of life not tolerated in the community, the better for him; and there seems to be evidence to show that the cities and towns which most consistently make an effort to exact work of the men whom they lodge and feed do most to make this understood, and thereby do most to check vagrancy.

The Committee wish to acknowledge the careful and thoughtful answers received from many of the towns in answer to the fifteen original questions; they indicate a serious and persistent effort to reduce vagrancy. Valuable suggestions were made in a number of the answers regarding experience, and in letters accompanying the answers.

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MISCELLANY AND NOTICES.

RACE PROBLEMS IN CUBA.

If no other result were to follow from the recent colonial expansion of the United States than the publication of the Cuban Census of 1899, and that of Porto Rico to follow close upon, the Spanish war would certainly not have been entirely in vain. This first volume throws a flood of light into a very dark corner of the earth. Few places seem to have been so little exploited scientifically as the islands which have been recently acquired by the United States. This fact can only be appreciated by students in search of definite information.

As for the population of Cuba, beside the merely descriptive traveller's tales there is little else of value beside Humboldt's *Essay on Cuba*, translated by Thrasher some fifty years ago; the compendious volumes of Ramon de la Sagra; and, quite recently, the excellent volume, *Cuba and Porto Rico*, by Mr. R. T. Hill of the United States Geological Survey. The Census, it is true, brings no absolutely new relationships to light; but it does a great deal to make definite and certain those which have heretofore been merely shadowy and vague. Without essaying to review the entire volume, it may not be without interest to comment upon certain of the facts brought forth, which are of large interest to the people of the United States in determining the policy which shall be pursued in future toward their new possessions.

The first point to notice is the striking contrast between Cuba and Porto Rico and the other islands in the West Indies in respect of their colored population. This may be considered first in respect to the absolute proportions of the various races, and secondly, as regards the population movement. As to the first point, the general facts are already well known. In Cuba 67.9 per cent of the population is of European stock, with 61.8 per cent in Porto Rico; while Jamaica had but 2.3 per cent of white population in a total of 639,000; the Barbadoes had 8.6 per cent, and the Leeward Islands 4.24 per cent of white population. And then we have the extreme case of Hayti, in which the proportion of white blood is now almost too small for

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enumeration. Add to this the fact that the movement of population has steadily widened the contrast between the Spanish and British West Indies. Cuba's negro population, constituting at its maximum in 1841, 58.5 per cent, has now fallen, as above stated, to less than one-third. In Jamaica, on the other hand, two hundred years ago, the whites constituted nearly one-half of the population, this proportion being now reduced to an insignificant percentage. This condition of affairs in Jamaica is typical of all the other West Indies.

The contrast between the British and Spanish West Indies, above mentioned, suggests a still further query, big with importance for the future. Slavery is but recently abolished in Cuba — in law not until 1880, in fact not until 1887 — since which time the country has been for the most part rent by civil war. Never before in her history until now has the negro population of Cuba been normal in times of peace. For generations under slavery a great disproportion numerically between the sexes prevailed, a disproportion noted by all writers, and especially emphasized by Humboldt. This disproportion of the sexes, consisting of an overwhelming preponderance of imported male slaves, is probably one of the factors which has prevented the negro population from increasing as it otherwise might have done. In order to repair the losses by excess of deaths over births it is estimated that nearly 1,000,000 negro slaves have been imported into the island during her history.

The question of present importance is this: Relieved from the rigorous hardships of slavery, and with a normal relation between the sexes almost for the first time established, will the negro population now begin to increase at a much more rapid rate than heretofore? Or will the conditions prevailing in our Southern States, characterized by a much slower increase of negro than of white, continue? If the forebodings of de la Sagra, Steele, and others are realized, both Cuba and Porto Rica may be expected to go as Hayti, Jamaica, and the other West Indies have done.

The next query of importance concerns the possibility of the adaptation of the European to the climate of these West Indian islands. There can be no question as to the adaptability of the Spaniard. The numbers of the present native-born Cuban white population are clear enough proof of the success of this nationality in the tropics. We refer rather to the possibility of an acclimatiza-

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tion of the Anglo-Saxon stock, and especially of the American type. In this respect, perhaps, Cuba is somewhat less favorably situated than other islands, such as Jamaica, the Bahamas, and the Barbadoes, where the health of the English whites seems to be fairly good. A contrast also disadvantageous to Cuba will probably have to be noted between itself and Porto Rico. There can be little doubt that the tropical characteristics of Cuba are more strongly accentuated than in the smaller islands round about. The Cuban Census at hand does not yield any satisfactory data upon this point. This appears to be through no fault of the census authorities, but rather by reason of an absolute lack of reliable data. Ramon de la Sagra devotes considerable space in his volume on population to the discussion of vital statistics, but it is probable that he would have done better scientifically if he had followed the dictum of this Census which, after a considerable statistical compilation, remarks that "no confidence can be placed in the accuracy of these figures." It is to be hoped, moreover, that all vital statistics hereafter collected will clearly distinguish between the colored and white population. Hoffman has brought together much data for many of the British West Indian colonies; but nothing for comparative study would seem to be available for Cuba, judging from this volume. Some years prior to the raising of the question of colonial expansion we ventured to discuss the question.[1] Our conclusions from available data at the time were definitely unfavorable to the prospect of successful acclimatization of the people of Northern Europe. The facts are of primary importance; for the entire future of our colonial policy must be determined by them.

Another topic which is worthy of discussion concerns the economic value of the negro for industrial exploitation of these West Indian Islands. Of course if the present high proportion of people of European, and especially of Spanish, extraction is to continue, the labor question may resolve itself along those lines. But if, on the other hand, it turns out that other and more energetic races are unable to hold their own in these islands, it may be that the negro, as during slavery times, may again of necessity come to constitute the bulk of the laboring population. Observers agree as to the superior character at the present time of the Cuban and Porto Rican negro as compared with other types in the West Indies. Barbadoes is perhaps the only exception, and here the density of population and the absence

[1] *Popular Science Monthly*, March and April, 1896.

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of unappropriated land suitable for squatters has forced the negro to be industrious. Porto Rico has had practically little experience with the negro as born out of slavery; and under servitude, the possibility of acquiring freedom by purchase surely must have been a spur to continued labor. Will the Cuban negro now degenerate to the type of the natives in Jamaica, improvident, happy-go-lucky, and good-for-nothing; or will he be able to preserve his economic status at its present efficiency. It is a common practice among writers upon the West Indies to quote the harrowing descriptions of Livingston in his *Black Jamaica*, or Spencer St. John in his volume on Hayti. The only impartial observer in this direction seems to be Mr. Hill, whose opportunity for comparative observation has certainly been excellent. And he remarks of the Haytian negro, left to himself for almost a century, that he compares very favorably with the negroes of the best West Indian type. At all events, it would seem that the education of this and the Porto Rican negro population must be at once begun aright. There can be little question that in our Southern States, owing to the mistakes and the deficiency of the present system, the negro economically is becoming less valuable. It behooves Cuba to take steps at once to see that the degenerating influences of emancipation shall not uninterruptedly come into play; otherwise the only hope for the industrial development of the island will be to fall back upon the policy of importation of Coolie or Chinese labor, as already tried in several of the British colonies.

A notable contrast between Cuba and the other islands seems to be found in the relative proportion of the sexes. There is a distinct excess of males over females in the Cuban population, differing in this respect from Jamaica, Porto Rico, the Leeward Islands, and the Bahamas. This of course is primarily traceable to the effects of immigration; that is to say, a population recruited by immigration will almost always be found to include an excess of males. Cuba is distinct from Porto Rico and Jamaica in offering many inducements to immigration, its territory still being very sparsely settled; whereas, on the other hand, the other West Indian Islands are almost as densely populated as it is possible for them to be; and many of them are characterized by an excess of emigration for that reason. Emigration, of course, draws off the males leaving females, as observed in these islands, in excess. It would be interesting to inquire how

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far the relative disproportion of the sexes, as in Hayti,[1] where little movement of population takes place, may be due to the degree of crossing of black and white, or to other economic factors. There is some indication that females at birth are very largely in excess among half-breeds. The determination of this point, however, will require more exact statistical information than is at present at hand.

In conclusion, we may call attention to one other contrast between Cuba and Porto Rico and other West Indian Islands as brought out in this excellent piece of work. It seems as if in all the Spanish and French West Indies the proportion of those of mixed parentage was far greater than in the colonies of Great Britain. The Anglo-Saxon here as everywhere holds aloof from intercourse with those of inferior race; and we have as a result in Barbadoes and in Jamaica, for example, the pure white and the full-blooded negro clearly set apart from one another. In the Spanish islands, and in the French colony of Martinique, on the other hand, no such antipathy to intermarriage of the races seems to prevail, and a gradation from one to the other is commonly to be observed. All through the West Indies also it is to be noted that there is a lack of that social antipathy between black and whites which lies at the root of the negro problem in our own Southern States. For example, there is no such abhorrence of the employment of white and negro labor side by side as we find in the United States, whereby the problems of social control are considerably simplified. Whether this docile condition of the negro is due to the fact that he is kept under tutelage to the white by the European clergy, rather than left to the mercy of his own native leaders, is perhaps impossible of determination. There can be little question, however, that the contact of one race with another engendered by this means is socially beneficial to both.

WILLIAM Z. RIPLEY.

EDUCATION OF WOMEN.

Education of Women. By M. Carey Thomas. *Monographs on Education in the United States:* edited by Nicholas Murray Butler. Department of Education for the United States Commission to the Paris Exposition of 1900. Pp. 40.

Among the monographs edited by Prof. Nicholas Murray Butler for the United States Commission to the Paris Exposition of 1900 is

[1] An overwhelming proportion of females is noted by many observers; as Spencer St. John, p. 130; Tippenhauer, *Hayti*, p. 437.

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one on the *Education of Women* by Miss M. Carey Thomas, President of Bryn Mawr College. This paper presents facts and figures not previously related and makes available valuable statistical data.

The higher education of women is naturally divided into college and professional education. College education is carried on in three different classes of institutions; co-educational colleges, independent women's colleges, and affiliated colleges. The institutions which have been co-educational from the outset are Oberlin, opened in 1833, chartered as a college in 1850; Utah, opened in 1850; Iowa in 1856; Washington in 1862; Kansas in 1866; Minnesota in 1868; and Nebraska in 1871. In 1870, Michigan, then the most important western university, opened its doors to women, and its example was quickly followed by all the other universities then existing in the west. All the state universities of the west organized since 1871 have admitted women from the start. State universities are now open to women in twenty middle and western states; and the one university in each of the four territories, Arizona, Oklahoma, Indian, and New Mexico is open to women. Of the 11 southern state universities only 3, those of Virginia, Georgia, and Louisiana are still closed to women. The one eastern state university, that of Maine, admitted women in 1872.

The greater part of college education — 70 per cent in 1897 — is carried on in private, not in state universities. To show the different attitude toward co-education of the different sections of the United States the following figures are given: In twenty middle and western states, and in four territories, excluding 22 Roman Catholic colleges and seminaries, there are 196 colleges[1] of which 183 are co-educational and one has an affiliated women's college; in fourteen of these states and all four of the territories every college for men is open for women; in fourteen southern and two southern middle states, excluding 21 Roman Catholic colleges and seminaries, there are 161 colleges, of which 125 are co-educational and only 36 are separate colleges for men. Among the 36, however, are 3 very important state and 2 private universities. Roman Catholic colleges apart, all the colleges in four of the southern states are co-educational. In the New England and northern middle states, 17 Roman Catholic institutions excluded, out of 64 colleges, only 29, or less than one-half, are co-educational. The colleges for men only, include, with the exception of Cornell, all the largest undergraduate colleges in

[1] Throughout the monograph the word *college* is used to denote *undergraduate* education.

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this section. The separate colleges for men and women are in the east, and it is in the east only that any preference for separate education is shown by either sex.

The growth of co-educational colleges in the United States has been from 30.7 per cent of the whole number in 1870 to 70 per cent, or, excluding Catholic colleges, 80 per cent in 1898. Not only is the number of co-educational colleges increasing, but the number of women relatively to the number of men students is also increasing. During the eight years, from 1890 to 1898, men have increased in co-educational colleges 70 per cent, women 105.4 per cent. During the same period, in separate colleges for men, men have increased only 34.7 per cent, while in separate colleges for women, women have increased 138.4 per cent. This seems to prove that women prefer a separate education, while the reverse seems true of the men.

To show the growth of co-education, the 480 colleges enumerated by the United States Commissioner of Education have been taken as a basis. The larger part of these cannot of course be considered institutions for higher education; accordingly, employing four means of classification likely to commend themselves to the fair-minded student, the author has selected 58[1] which may properly be compared with colleges and universities abroad. Of this number (58) 4 are independent women's colleges, 3 are women's colleges affiliated with colleges for men, and 30, or 58.8 per cent, are co-educational. Of the 21 colleges closed to women in their undergraduate departments 5 have affiliated to them a women's college through which women obtain some share in the undergraduate instruction; 4 of the 5, as well as 3 others of the best known colleges for men, make no distinction between men and women in graduate instruction; one maintains a co-educational medical school. This leaves on the list of 58 most important colleges in the United States, aside from 2 Catholic colleges, only 10 (Dartmouth, Amherst, Williams, Clark,[2] Princeton, Lehigh, Lafayette, Hamilton, Colgate, and Virginia, all situated on the Atlantic seaboard) to which women are not admitted in some department.

The author treats separately 11 independent women's colleges[3] and 5 affiliated colleges.[4] Details are given relative to the number of

[1] For detailed list see foot-note, p. 12, *Monograph on Education of Women.*

[2] Since the monograph was written all departments of Clark have been open to women upon equal terms with men.

[3] Bryn Mawr, Smith, Vassar, Wellesley, Mt. Holyoke, Women's College of Baltimore, Wells, Elmira, Randolph Macon Woman's College, Rockford, and Mills.

[4] Radcliffe, Barnard, Woman's College of Brown, College for Women of Western Reserve, and the H. Sophie Newcomb Memorial College for Women of Tulane.

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instructors, number of undergraduates, graduate and special students, productive funds, buildings and their cost, size of library, scientific equipment, land, and tuition fee; the exact relation is given of the 5 affiliated colleges to the colleges with which affiliated.

Of the independent women's colleges 4, Bryn Mawr, Smith, Wellesley, and Vassar, and of the affiliated colleges 3, Barnard, Radcliffe, and Western Reserve are on the list of 58, and, with one exception, on the list of 52 leading colleges in the United States given in the 1899–1900 edition of *Minerva;* all 7 are included in the 22 colleges admitted to the Association of Collegiate Alumnæ; 4, Radcliffe, Smith, Vassar, and Wellesley are among the 46 colleges of the United States having three hundred students or upward; 4, Bryn Mawr, Wellesley, Radcliffe, and Western Reserve are included in the 23 colleges belonging to the Federation of Graduate Clubs; 2, Vassar and Bryn Mawr, are among the 29 colleges of the United States possessing funds of a million dollars and upwards[1]; 3, Smith, Wellesley, and Vassar are among the 23 largest undergraduate colleges, and one, Smith, ranks in size as the tenth undergraduate college in the United States.

Under the heading "Professional Education" are given facts with regard to graduate instruction in the faculty of philosophy, graduate fellowships and scholarships, and professional and technical education.

Of the 23 colleges in the United States, included in the Federation of Graduate Clubs, 16 admit women without restriction to graduate courses, and to competition with men for many of the scholarships and honors. Two admit women only. One admits women to certain courses through an affiliated college. One admits to one university department. This leaves only Clark,[2] Princeton, and the Catholic University, which entirely exclude women. In these 23 graduate schools, women formed 26.8 per cent of the whole number of graduate students in 1898–99. Among the graduate students of the United States a remarkable increase of women is shown during the last ten years; an increase from 13.27 per cent in 1889–90 to 24.04 per cent in 1897–98, or, numerically, from 271 out of a total of 2041 to 1398 out of a total of 5816.

In 1899 there were open to women 319 scholarships, varying in value from $100 to $400 (50 of these exclusively for women), and 2 foreign scholarships (1 exclusively for women); 81 residence fel-

[1] Smith has productive funds amounting to $900,000.

[2] Opened to women in all departments November, 1900.

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lowships of the value of $400 or over (18 of these exclusively for women); 24 foreign fellowships of the value of $500 and upwards (12 of these exclusively for women).

Figures are given which show that the number of women entering upon professional study is increasing rapidly. In 1898 the number of women students in the United States according to professions was as follows: In theology, 198; law, 147; medicine, regular and irregular, 1397; dentistry, 162; pharmacy, 174; schools of technology and agriculture endowed with national land grant, 2281.

Under the heading "General Considerations" the author states that in 1897–98 there were studying in the undergraduate and graduate departments of co-educational colleges and universities in the United States 17,338 women, and in the 11 independent and affiliated colleges, herein mentioned, 4959 women; women thus forming 27.4 per cent of the total number of graduate and undergraduate students. The 30 co-educational, 4 independent and 3 affiliated women's colleges on the selected list of 58, with the addition of the Women's College of Brown, have conferred the bachelor's degree on 14,824 women — exclusive of the class of 1900. In 1897–98, 11.4 per cent of all the women studying in co-educational colleges, and 13.4 per cent of all the women studying in independent women's colleges, obtained the bachelor's degree. In the same year 13.3 per cent of all men undergraduate students obtained the bachelor's degree.

In all secondary schools in the United States (1899) 56.5 per cent of the pupils were girls, and 13 per cent of the girls enrolled, as against 10 per cent of the boys enrolled, graduated from the public high schools.

The number of women students studying in German universities in 1898–99 was, approximately, 471, probably mainly foreigners; in France, in 1896–97, approximately, 410, of whom 83 were foreigners; in England and Wales, in 1897–98, approximately, 2348. The total number of women graduates in England and Wales who have received degrees or their equivalent from English and Welsh universities (autumn of 1899) is 2180.

At the close of the monograph a brief paragraph each is devoted to the health, marriage rate, and occupations of college women, co-education versus separate education, and to a modified versus an unmodified curriculum. The author believes thirty years' experience to indicate that whatever changes in the college curriculum may be made in the future will be made alike for men and women.

ALICE UPTON PEARMAIN.

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MONTHLY BULLETIN OF THE STATISTICS DEPARTMENT OF BOSTON.

Reviews of the special reports in Bulletins 1 to 9, vol. i, may be found in the December, 1899, number of this publication.

Vol. I, No. 10, October, 1899.

This number contains, in the appendix, a table showing the *Political Condition, by Sex, in 1895.* This table is taken from the Massachusetts Census of 1895: *Population and Social Statistics*, Part 3, vol. i. It shows for each ward of the city of Boston the number and per cent of the male population (twenty years of age and over) and of the total population (both sexes, all ages). The amounts are given for voters, not-voters, aliens, etc., and the percentages show the native-born voters, foreign-born and naturalized voters, aliens, etc. In the list of males, of twenty years of age and over, it may be noted that over 99.5 per cent are ratable polls, though less than 75 per cent are voters. Of those not voting, over 80 per cent are aliens, the other 20 per cent representing over 8500 of Boston's male population. It is noticeable also that the total ratable polls in the table of "both sexes, all ages," is the same as in the male population column; there being, apparently, no female voters. The ratable polls compose but 30 per cent of the total population; while the actual voters are less than 23 per cent.

Vol. I, No. 11, November, 1899.

Foreign Commerce of the Principal Ports of the United States, 1890–99. This article contains a series of ten tables, compiled from the *U. S. Commerce and Navigation Reports*, and shows the position of New York, Boston, and the three other chief trade ports of the country with regard to the foreign commerce of the country in the last decade. New York, of course, is pre-eminent in the lists. In imports Boston comes second, except in the year 1894 when a surprising drop of nearly twenty millions of dollars in the value of imports caused her to cede the place to Philadelphia. As regards exports, Boston is led only by New York and, in 1890, 1891, 1892, and 1897, by New Orleans and, in 1890, 1897, and 1898, by Baltimore. For the five years, 1890–94, New Orleans comes next to New York; but for the five years, 1895–99, her place is taken by Boston. For the

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full decade Boston is third, being led by New Orleans by less than $3,000,000.

The tables show that, in the last ten years, the proportion of the aggregate commerce of the five chief ports has become continually less (the smaller ports of Galveston, Newport News, Savannah, and San Francisco having greatly increased, especially in exports).

Vol. I, No. 12, December, 1899.

The appendix to this bulletin is of three parts: (1) Summary Tables for the Year, 1899; (2) Expenditures of Public Institutions, 1894–99; and (3) Boston Election Statistics — Ten Years.

In the Boston election statistics twelve tables are given, showing with suitable summaries the number of registered voters in the city of Boston, and the votes cast per ward in the various elections of country, state, and city. The degree of interest shown by the *ratable polls* in the principal questions which occur periodically may be shown by the following tables: —

State Elections, 1890-99.

Ratable Polls.	Registered Polls.		For Governor.		For President.	
	Per cent.	Year.	Per cent that Voted.	Year.	Per cent that Voted.	Year.
Maximum	62.06	1895	84.73	1891	85.79	1892
Minimum	51.56	1890	61.78	1899	84.96	1896
Mean	59.21	....	75.72	....	....	....

Municipal Elections, 1890-99.

Ratable Polls.	Registered Polls.		For Mayor.		On License.	
	Per cent.	Year.	Per cent that Voted.	Year.	Per cent. that Voted.	Year.
Maximum	63.28	1897	83.86	1895	75.38	1899
Minimum	53.58	1890	74.99	1891	57.00	1893
Mean	60.37	....	78.36	....	67.15	...

"The number of male voters registered for the municipal elections ranged between 68,100 in 1890 and 102,875 in 1899, and was

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89,728 on the average; while the number of female voters ranged between 6008 in 1891 and 12,073 in 1895, and was 9609 on the average. In 1895 the women of voting age in Boston numbered 167,017, and outnumbered the men of voting age by 14,597."

The important place held by the year 1895 in the percentages should be noted in the following table: —

Per cent of Actual Voters	1875.	1885.	1895.	Mean. 1875-95.
(To ratable polls)				
Who voted for governor	28.66	35.67	42.87	36.90
Who voted for mayor	28.38	38.24	49.15	40.31
(To legal voters)				
Who voted for governor	39.79	46.40	59.02	49.99
Who voted for mayor	39.41	49.74	67.66	54.59
(To registered voters)				
Who voted for governor	69.96	73.15	76.43	74.03
Who voted for mayor	68.05	75.95	83.86	78.10

"It may be added that in 1895 the per cent of legal voters (males) who voted on the referendum of that year was 57.23 against 59.02 per cent who voted for Governor, and 67.66 per cent who voted for Mayor . . . The total number of men who voted amounted to 57.23 per cent of the legal voters, while that of the women may be safely estimated as amounting to less than 10 per cent of the women entitled to be registered . . . In 1891 the payment of a poll-tax as a prerequisite to voting was abolished by amendment of the Constitution. In 1891 the per cent of assessed polls who registered for the municipal election was 54.74. It rose to 60.79 per cent in 1892, since when it has fluctuated between 61.09 in 1898 and 63.28 in 1897. Similarly, the per cent of votes cast to assessed polls, which rose from 41.85 in 1891 to 47.74 in 1892, has uniformly exceeded 47.74 per cent, excepting in the years 1896 and 1898, in which years no election for Mayor occurred."

VOL. II, NOS. 1, 2, AND 3, MARCH, 1900.

In this bulletin three studies are presented: (1) Tax-Rate, Valuation and Indebtedness of Massachusetts Cities, 1899, 1898; (2) Boston School Census; and (3) Infant Mortality in Massachusetts Cities.

Tax-Rate, Valuation and Indebtedness of Massachusetts Cities, 1899, 1898. This article contains several tables, compiled from the State

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Census of 1895 and various public documents of the Board of Health, Tax Commissioner, etc.

In the study of *Boston School Census* there are two tables, showing the results of the annual school census made in September, 1899. The tables give (1) the number at public schools, at private schools, and not attending school, for each ward of the city, and (2) a comparison for each ward of the years 1898 and 1899. The age limits are 5 years and 15 years. Of the total children between 5 and 15 years of age, 76.48 per cent go to public schools, 15.61 per cent go private schools, and 7.90 per cent attend no school. There has been a gain in school attendance of 3408 over 1898, though a loss is recorded for wards 2, 9, 11, 12, 18, and 22. The losses in wards 9 and 11 were 316 and 331 scholars, respectively. The loss in ward 2 was 149.

Infant Mortality in Massachusetts Cities.— This is taken from the *Thirtieth Annual Report of the State Board of Health of Massachusetts.* The following table summarizes the information of the article: —

INFANT MORTALITY OF CITIES, 1891-97.

	Births.	Deaths, 0-1.	Infant Mortality.	Rank.— the State = 100.	
				1891-97.	1881-90.
Cities	344,039	56,493	164.2	106	109
Towns, etc. ..	132,119	17,113	129.5	84	80
The State ...	476,158	73,606	154.6	100	100

VOL. II, NO. 4, APRIL, 1900.

This bulletin contains two reports: (1) Valuation Statistics, 1899, and (2) Extraordinary Receipts and Expenditures.

Valuation Statistics, 1899.— The number of square feet of land taxed, the assessed valuation of this land, and the assessed valuation per square foot, are given for each ward, and for the city. The analysis gives the amount, valuation, and valuation per square foot of the occupied land as opposed to vacant land, and of the vacant land under the two headings of vacant upland and marsh and flats. The average assessed valuation of all the land taxed is nearly $0.66 per square foot, varying from $0.05 per square foot in ward 23 (West

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Roxbury) to $15.85 in ward 7 (the business centre). The average assessed valuation of the occupied land is $1.49 per square foot, varying from $0.13 in ward 23 to $16.69 in ward 7. The average assessed valuation of the vacant land is, for vacant upland, $0.19, varying from $0.04 to $12.27; for marsh and flats, $0.04, varying from $0.005 to $1.12. Of the total amount of land taxed 62 per cent is classed as vacant land and only 38 per cent as occupied land. "A comparison of the totals for 1898 and 1899 shows that the total number of feet of land taxed has declined 3,663,234 square feet. This is probably due to the growth of property exempt from taxation, either in the form of new streets, or of property belonging to the city or to other authorities and institutions exempted from taxation. The number of square feet of occupied land increased 10,650,101 square feet, whereas the vacant upland declined 3,071,911 square feet, and the marsh land and flats declined 11,241,424 square feet. With regard to the value of land per square foot, the total land taxed has increased in value by $0.036; occupied land, $0.008; vacant upland, $0.024 per square foot, while marsh land has declined $0.012 per square foot."

VOL. II, NO. 5, MAY, 1900.

No appendix, and consequently no special report, is contained in this bulletin.

VOL. II, NOS. 6, 7, AND 8, AUGUST, 1900.

Boston Elections, 1899.— A series of tables is presented here to determine the degree of interest shown by the registered voters of Boston in the questions passed upon at the state election of November 7th, and the city election of December 12th. The tables have been compiled from data given in the *Annual Report of the Election Department for the Year 1899.* "The mean degree of interest shown by the registered voters of Boston in 1899, expressed in per cent of actual to possible vote, was 69.69 at the municipal, against 59.26 at the state election; . . . the per cent of actual to possible vote for mayor in 1899, *viz.*, 79.07, was 1.23 per cent greater than in 1897, when it was 77.84, and 4.79 per cent less than in 1895, when it was 83.86." The following table gives a summary of the article: —

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BOSTON ELECTIONS, 1899.

Voted for	Possible Vote.	Actual Vote.	Per cent of Actual to Possible Vote.	Per cent of Actual to Vote Cast for Mayor.
Municipal Election.				
Mayor	102,875	81,341	79.07	100.00
Street Commissioner	102,875	79,363	77.15	97.57
Aldermen	128,847	97,818	75.92	96.01
Replacing of tracks on Tremont street	102,875	77,809	75.63	95.65
Licensing sale of liquor	102,875	77,552	75.38	95.33
Eight-hour law	102,875	75,319	73.21	92.59
Councilmen	308,625	217,189	70.37	88.99
School Committee	906,080	588,407	64.94	82.13
Totals	1,857,927	1,294,798	69.69	....
State Election.				
Governor	100,491	62,086	61.78	78.13
Lieut.-Governor	100,491	61,812	61.51	77.79
Senators	100,491	60,479	60.18	76.11
Councillors	100,491	59,919	59.63	75.41
Other State officers	401,964	238,908	59.44	75.17
Representatives	200,982	112,269	55.86	70.65
Totals	1,004,910	595,473	59.26	....

E. H. D.

STATISTICS OF INSTITUTIONS.

First Biennial Report of the Board of Control of the State Institutions of Iowa for the biennial period ending June 30, 1899.

The first report of the new board created by the legislature of Iowa in March, 1898, with full powers of management and control over the state hospitals for the insane, the Soldiers' Home, the State Penitentiary, and the various state institutions for the blind, the deaf, and the feeble-minded, is an exhaustive, and in many ways a model, document. Its statistical tables were prepared by Dr. W. R. Patterson of the State University of Iowa, and present certain features of considerable interest. The outline of Dr. Patterson's plan, as published in a separate pamphlet, emphasizes the necessity, not always recognized, for basing all statistics on the number of persons received and discharged, and not on the total institutional population, in order

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to prevent laying undue weight on a constant group of permanent cases. Re-admissions are ignored in the case of the institutions for the deaf and the blind; and re-admissions within one calendar year are not included in the hospitals for the insane. On the other hand, re-admissions to the penitentiary indicate new offences and are included in the returns.

An excellent feature in the tables relating to the occupation of inmates prior to admission is the classification of females with reference to the occupation of the head of the family, with the phrase "wife or daughter" suffixed to the title of the occupation. This system tends to an intelligent view of the social environment of the subject, and in the case of certain Iowa institutions appears to have been markedly successful; in other instances the large proportion of women classed as "domestics" shows that it has not been intelligently applied. Thus in the Mount Pleasant Hospital 90 per cent of the females are recorded as domestics; in the Independence Hospital only 7 per cent are so recorded. The deficiencies are doubtless due to the fact that the new board has been in control for a year only; the plan itself is admirable as rendering the statistics of female occupation, ordinarily quite valueless, of considerable moment. Another significant feature of the report is the table showing hereditary tendencies in those patients admitted to one of the insane asylums. Ten degrees of relationship are included in the table, and of the total of 3518 patients 1052 showed some hereditary history of insanity, and 349 had insane parents.

In Dr. Patterson's scheme for the future further entries as to the condition of parents of the patients are contemplated, under the captions, criminal, intemperate, epileptic, deaf, dumb, blind, and parents' blood relations.

Dr. Patterson's plan includes data, to summarize the titles only of his numerous tables, regarding the movement of population, the age, sex, color, birthplace, conjugal condition, education, previous occupation, and physical condition of those received, the nativity and moral condition of parents, besides special statistics as to the previous records, and condition of inmates after discharge, the causes leading to crime — as home life and bad habits; and, finally, certain tables showing the proportion of the asylum and prison population employed, and the nature of the employment. The scheme, as a whole, for the various classes of institutions treated includes forty different tables.

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It may be heartily commended as a long step toward simplicity, uniformity, and scientific arrangement of institutional statistics.

In detail one may, of course, find opportunities for criticism. For instance, the classification by color, as white, black, red, and yellow, might be replaced by a racial subdivision more harmonious with anthropology, and yet simple enough to be applied by institutions' officials. The classification of the conjugal condition of the parents of inmates under the headings "happy" and "unhappy" seems hardly to promise sufficient exactness to be of statistical value. Finally the tables giving the causes of insanity, with which Dr. Patterson states his intention of doing away in the future, furnish abundant proof of the wisdom of that resolution. Among these "supposed or assigned" causes are the following: hysteria, change of home, disappointment, spiritualism, paralysis (classed as a moral influence), poor health, Christian Science, ill treatment, military service, political excitement, trouble, worry, and previous attacks of insanity.

C.-E. A. WINSLOW.

CENSUS OF CUBA.

Report on the Census of Cuba, 1899. Lieut.-Col. J. P. Sanger, Director; Henry Gannett and Walter F. Willcox, Statistical Experts. War Department, Washington, 1900; pp. 786.

Dr. Ripley in another communication has called attention to the suggestive material which the census volume on Cuba contributes to sociological problems of race. There are other features of this statistical report which deserve mention.

In the first place, the war department is to be congratulated on having entrusted the work to competent statisticians. This is a happy omen when it is remembered that neither of the editors is connected with the war department. Again, the war department and the editors are to be congratulated upon the prompt execution of their work. It is exceptional to have a census in which tables so complex are compiled and edited within a little over a year from the beginning of the field work. A change has also been introduced into the form of the volume which makes it much more convenient for the reader. The pages are octavo instead of quarto, and consequently the volume is easily handled. It raises the query whether it would not be better to have more of our census volumes in this shape. The usual quarto is forbidding and difficult to shelve.

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This volume covers a considerable scope. The geography and history of the island are briefly discussed. Under history, attention is called to the causes affecting progress in the past. A brief sketch of the political organization is here included. Pages 72–167 are devoted to a discussion of the tables relating to the total population, urban and rural, distribution in altitude, sexes, general nativity and color, age, birth-place, citizenship, education, conjugal condition, illegitimacy, occupation, and number and size of families.

Pages 523–564 are devoted to agriculture, in which tables are presented in regard to farm areas, tenure by race and by size of farm, production, especially of sugar, molasses, and live stock.

Pages 565–620 are devoted to education. In the appendices are the orders organizing the census, with the reports of the six native supervisors, and the reports of three enumerators. There is also a list of enumerators and some miscellaneous memoranda.

The editors have served the public in introducing into the text of the census comparisons between the population of Cuba and other population groups, particularly in the West Indies. This latter point is of special value, inasmuch as the statistics of this group of islands is somewhat difficult to obtain. The analysis of age statistics is quite full and more detailed than usual. There is an effort to determine the loss of life in Cuba during the last four or five years by the decrease by deaths over the increase by births. The reports of the native supervisors are full of interest. These officials undertook their work apparently with commendable civic pride, which speaks well for political responsibility and faithfulness in Cubans who may be called upon for government service. The interest of the volume is increased by photographs and a series of charts.

D. R. D.

ENGLISH CENSUS TAKING.

In the *Journal of the Institute of Actuaries* (London) for October, 1900, there appears (pp. 341–352) a paper on census taking, read before the Institute, by Reginald Dudfield, Medical Officer of Health of Paddington, England.

In the matter of a census, two things arise for primary consideration: (1) the character of the census, *i. e.*, the information to be taken, and (2) the frequency with which the census should be taken.

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In regard to the first question: The International Congress of Statisticians, held in St. Petersburg in 1872, agreed to certain minimum requirements for census taking, among them being (1) that the census should be *de facto*, and (2) that the information obtained of every individual should include the name, age, sex, relationship to the householder, civil status, occupation, religion, language, education, birthplace and nationality, residence, and specific mention of such infirmities as blindness, deaf-mutism, idiocy, and insanity. A comparison is made in the paper of the information prescribed to be obtained by the (English) census acts for 1881, 1891, and the recent Act for the coming year, 1901. This comparison is tabulated as follows: —

Census of	*Information prescribed to be obtained.*
1881, 1891, 1901	Name; sex; age; conditions as to marriage; relationship to head of family; birthplace; infirmities (blind, deaf, dumb, imbecile, or lunatic).
1881	Rank, profession, or occupation.
1891, 1901	Profession or occupation.
1891, 1901	(For Wales and County of Monmouth) whether speaking Welsh only or both English and Welsh.
1891, 1901	(For tenements of less than five rooms) number of rooms occupied.
1901	(For those born abroad) nationality.

Concerning this, Mr. Dudfield said, "Each successive schedule has approached more nearly the standard suggested at the St. Petersburg Congress, but that for next year [1901] is still deficient in certain minor matters. Language is only dealt with to a very limited extent. . . . Attempts have been made to secure a religious census, but the opposition has always been, and probably always will be, too strong. Having regard to the amount now spent on compulsory education, it is remarkable that no enquiry is to be made as to the results obtained. It would probably be difficult to frame a satisfactory standard, and more so to test the accuracy of the answers given with reference to any standard adopted. In Scotland, information is to be obtained with respect to each dwelling-house, as to 'the number of rooms, including a kitchen (if any) as a room, having a window, not being a window with a borrowed light.'"

In regard to the second question,— the periodicity of the census: The St. Petersburg Congress of 1872 decided that the census should

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be decennial. England remains with a few other countries in adhering to this period; "but," says Mr. Dudfield, "it is becoming every day more apparent that the interval is too long, and strenuous efforts were made both in 1890 and this year to secure the adoption of a shorter interval." He considers that the English government is prepared to admit the necessity for a quinquennial census and awaits only the coming of the proper year to make special legislation in this regard. He notes that an intermediate enumeration has been enacted for the metropolis of London for the purposes of equalization of rates. Also, an amendment, passed this year, of the Factory Act of 1895 proposes to enact that returns of all persons employed in factories and workshops shall be made to the chief inspector of factories at intervals of "not less than *one* nor more than *three* years." The Secretary of State is to be empowered to specify the particulars to be included in such returns. This, Mr. Dudfield regards as "the germ of an occupational census at much more frequent intervals" than the present one of ten years. Considering that there is a reasonable prospect of the inter-censal period being reduced to five years, he notes very pertinently that "with the establishment of a quinquennial census, it is probable that the census office would be made permanent, with much advantage to the whole system. It would also be requisite that the returns of each census should be issued more promptly than at present." Such a census need not be as full as a decennial census; it would be enough, he says, if the name, sex, and age of each individual were recorded for one unit of area only — for the smallest possible areas, indeed, *of a fixed character or description.*

In regard to the confusion that has in the past occurred in the proper tabulation of the various kinds of habitation, Mr. Dudfield recommends that houses, tenements, and flats be dealt with under separate headings, specific sub-tabulation being made to obviate the danger of error or ambiguity. For the first time, the confidential character of census information is laid down, in the Act for 1901, with a penalty for unofficially disclosing the information obtained. Information beyond that made public in the printed reports may (by Sect. 9, Factories and Workshops Bill) be sent at the discretion of the Registrar-General, "at the request and cost of the council of any county, borough, or urban district." Next year, the census schedules are, according to custom, to be filled out by the inhabitants themselves.

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On former occasions the enumerators were required to transcribe the schedules into enumerator books; this was not re-enacted this year. The matter of copying, correcting, verifying, etc., is left in the hands of the Registrar-General. Mr. Dudfield advocates giving to the enumerators the duty of filling the schedule, the schedules then being sent direct, without copying, to the census office. This, however, cannot be done under the present act.[1] It is worthy of notice that this latest act made no attempt to settle the details of *collecting* the census, the matter being left in the hands of the Registrar-General. The hope is expressed in the paper that, in any case, the enumeration will be put in the hands of men of intelligence and reliability; and Mr. Dudfield observes that "it seems a false economy to put in an untrustworthy foundation in the form of inaccurate work by enumerators, by offering such men a wage something less than that obtainable by a skilled mechanic."

E. H. D.

ITALIAN IMMIGRATION.

The *Fifth Annual Report of the Italian Bureau of Immigration at New York* (for the fiscal year ending June 30, 1899, pp. 21) gives a very clear and illuminating statement of the exact condition of Italian immigration to the United States. The total number of immigrants entered for the year at the Barge Office at New York is classified as follows: —

Italy,	76,489;	increase over the year before of 33 %, and 35 % of total.
Austria-Hungary,	53,349;	" " " " " " 66 " " 16 " " "
Russia,	43,717;	" " " " " " 90 " " 14 " " "
Great Britain,	28,197;	" " " " " " 14 " " 8.5 " " "
Germany,	13,925;	" " " " " " 7.5 " " 4.5 " " "

The one-third increase of Italian immigration is regarded as due to the greater commercial and industrial activity of the United States, after the recent war. There is, it is declared, an unusual demand for Italian labor; a demand too great for the supply.

[1] In the discussion which followed this paper, certain other reforms were suggested, based on deficiencies and inaccuracies noted in previous censuses. Among these reforms were, (1) specific definitions of "employer" and "employee"; such that one man may not find himself included in both categories; (2) specific statistics in regard to the dangerous or unhealthy trades and doubtful occupations, as regards mortality, retiring from business, classes of people employed, etc.; and (3) greater accuracy in regard to age; the age being taken for the "*next* birthday" rather than at the "last birthday," as more in accordance with the instinct and already established custom of the people.

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Of these 76,500 Italians, 82 per cent came from the south provinces, and 18 per cent from the north. The percentage of females is 33, which is considerably over that for the year before. This is regarded as denoting the establishment of Italian homes in this country. The ages of the immigrants may be classified as follows: 18 per cent under 14 years, 8.5 per cent over 45, and 73 per cent between 14 and 45. The immigrants are divided, as regards occupation, as follows: —

Laborers (*manuale*), . .	27,585	Barbers, . .	977
Farmers, ...	4,087	Miners, . .	844
Tailors, etc., ...	1,985	Carpenters, . .	797
Shoemakers, ...	1,831	Weavers, . .	520
Sailors, ...	1,272	Bakers, . .	374
Masons, ...	1,888		

There are also smaller numbers of stone cutters, blacksmiths, bookbinders, painters and decorators, gardeners, sculptors, and musicians. The money brought in by the Italians amounted to $788,805, or $10.31 *per capita*. This is probably a considerable undervaluation.

Most of the Italians remained in the East. The intended destinations were: —

New York, . . .	42,429	Massachusetts, . .	3,987
Pennsylvania, . .	9,314	Rhode Island, . .	1,041
Connecticut, . .	2,043	California, . . .	1,703
Illinois, . . .	3,039	Ohio, ...	1,022
Louisiana, . . .	3,163		

Those denied admission numbered 1445, or 1.87 per cent of the whole; 1024 were excluded as "coming under public charge"; 330 as coming "under contract"; and 88 for infectious diseases. "Admittance to this country is becoming more difficult every day, unless the immigrants are strong, young, and well provided with money; or unless, if of advanced age, they have near relatives here ready to provide for them in case of sickness, or while looking for work."

Many of the Italians fall soon into the Padrone (boss) system. They have to pay $5.00 apiece to get employment; and their wages are, on the average, practically less than $1.25 per day.. "The Padrone system, or *bossism*, can be defined as the forced tribute, which the newly arrived pays to those who are already acquainted with the ways and language of the country. Hence the great necessity for an office such as ours . . . As a means of obviating many of the evils above indicated, the Emigration Bill, now before the Italian Parliament, may be considered of prime importance. The bill provides for the opening of a Labor Bureau in connection with the

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present Italian Emigration Bureau at New York, and its object will be to provide work without the exaction of a fee, as well as to protect the Italian immigrant from abuses." The possible establishment of an Italian national bank in New York, with sub-branches, is also considered in the bill.

The report closes with acknowledgment of Italian and American legislation in regard to immigration to the United States; and ex-Commissioner General Stump is quoted as follows: "The joint endeavors of the respective governments have resulted in bringing to the United States a far better class of Italian immigrants."

E. H. D.

INTERNATIONAL STATISTICS.

M. le Dr. Jacques Bertillon, Chief of the Municipal Bureau of Statistics of Paris, has issued a comprehensive and valuable book of European statistics, entitled *Statistique international, résultant des recensements de la population éxecutés dans les divers pays de l'Europe pendant le xix^e^ siècle et les époques précédentes.* This work was prepared in conformity with the desire of the International Statistical Institute and the authorization of the municipal council of Paris, and was issued in the latter part of 1899.

Two similar publications have appeared previous to this; one being a volume of international population statistics, published in 1865 by Messrs. Quetelet and Heuschling of the Central Statistical Commission of Belgium, and the other being a volume giving particularly the censuses of 1870 but including summaries of all censuses previous to that time, issued in 1876 by Dr. Berg, Director of Statistics of Sweden.

The present work covers all the censuses of the second half of this century and includes totals and general summaries of all censuses taken in the years preceding 1850. The book is divided into three parts.

The first part contains summaries of the information obtained at various periods in all the continental countries. It gives the population (by sex, civil status, and in totals) obtained by censuses of this century and those previous. The tables are made more complete by the presentation of the *calculated* statistics of private authors for various earlier years, care having been taken to include also thoroughly con-

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sistent data from the volumes of Quetelet and Heuschling, and of Berg, previously referred to. In the case of England and Wales, for example, the calculated total population has been given for each decade from 1700 to 1800, and the regular statistics of total and sex population, by decade, from 1800 to 1890, the last five years including also the population by sex and civil condition. Equally valuable tables are given for all the European countries. The German Empire is given in detail as well as in total, each of its component duchies and principalities being represented. Italy is similarly treated.

The second part is a detailed presentation of the censuses taken in all European countries since 1850. The exact date of the taking of each census has been carefully recorded. With this, are given the areas of the countries at census periods, and also an explanatory statement in each case concerning the increase or decrease of territory involved. The increase of territory of Russia is given not only for Europe, but also in the tremendous Asiatic region of Siberia and northern China. Tables show for each country (1) the population by age, sex, civil status, and religious division, (2) the number and sex of those bearing physical or mental infirmities, and (3) the number, by sex, of foreigners, or aliens born in foreign countries. In accordance with the wish of the International Institute, the statistics of occupations and professions have not been included. Care has been taken, so far as was permitted by the exigencies of the work, to correct the discrepancies resulting from the different methods of classification and nomenclature pursued in the various countries, special consideration being given to data of the periods of 1850, 1860, 1870, 1880, and 1890, when the censuses were taken most nearly simultaneously. The order of countries adopted by Dr. Berg in his *Condition of the Population of Europe* has been followed by M. Bertillon. Detailed statistics, accompanied by suitable explanations, were obtained directly from the Directors of the Statistical Bureaus of the countries of England, Scotland, Ireland, Denmark, Norway, Sweden, Russia, Finland, Austria, Hungary, Croat-Slavonia, Switzerland, Germany, Prussia, Bavaria, Saxe-Royal, Wurtemberg, Grand-duchy of Baden, Alsace-Lorraine, Netherlands, Belgium, Portugal, Spain, Italy, Greece, Bulgaria, Siberia, and Roumania, and are therefore of complete reliability and great value.

The third part of the book contains general summaries and synopses. New tables have been made from the data already referred to,

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and these show the development of European population, by countries, during this century, while calculated summaries have been made giving social statistics.

E. H. D.

ARGENTINE STATISTICS.

Boletin Demografico Argentino; Buenos Aires, January, 1900.

This Bulletin is the second of its kind published by the Argentine Republic. It was prepared under the direction of Dr. Gabriel Carrasco, Director of the National Bureau of Demography (Oficina Demografica Nacional). The purpose of the bulletins issued by the Bureau is to present in readily accessible form the important facts relative to the movement of the population in the Argentine Republic. The present Bulletin contains statistics and a brief discussion of three principal subjects: "Influence of the Foreign Element on the Progress of the Argentine Republic"; "Immigration and Emigration in the Argentine Republic from 1857 to 1899"; and the "Demographic Movement of the City of Buenos Aires from 1838 to 1899."

"Influence of the Foreign Element on the Progress of the Argentine Republic."— Under this head are presented statistics showing the approximate number of immigrants to the Republic from the various foreign countries during the period 1857 to 1899, inclusive. The total number is shown to have been 3,102,000, nearly one-half of whom, or 1,519,000, were Italians. Spain contributed the second largest number, or 613,800; France was third, with 291,400; and Uruguay fourth, with 151,900. The other countries which contributed more than 50,000 emigrants destined for the Argentine Republic during this period of forty-three years were: Brazil, 77,500; England, 68,200; Chile, 65,100; and Germany, 52,700.

It is pointed out that this comparatively large influx of foreigners has greatly promoted the progress of the country and largely influenced the character of its economic development. The ethnologic character of the people, too, by intermarriage and otherwise has been beneficially modified. These results have been effected not merely by the number of immigrants, but also by the large excess of male immigrants. Of every 1000 immigrants, 712 were males and only 288 females. In every 1000 immigrants there was an excess of 424 males, who, if they marry at all, must contract unions with Argentine women, thus contributing to the formation of a new race.

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According to the best available data, the census of 1895 and the immigration figures since that date, the foreign-born population in the Argentine Republic on December 31, 1899, was 1,200,000, approximately one-fourth of the total population, which is estimated to have been 4,618,593.

An exceptionally interesting table is presented to show the ownership of real estate with distinction of foreign-born and native proprietors. In 1895 there were 407,503 proprietors of real estate in the Republic and 116,550 of these were foreign born. Of every 1000 natives, 99, and of every 1000 foreign born, 120 were proprietors of real estate. The foreign element, in whom the tendency toward real-estate ownership was strongest, were the Swiss, 229 of whom in every 1000 owned real estate. The Asiatics were second with a proportion of 210, and the Austrians were third with a proportion of 153. Taking the total population, approximately one in every ten owned real estate. It is interesting to note that in the city of Buenos Aires there were 26,701 foreign-born proprietors of real estate, and only 19,147 Argentine owners. Of the houses in Buenos Aires two of every three were owned by the foreign born, the numbers being 35,656 and 19,139, respectively.

In agricultural development the immigrants have played a significant part. In 1872 only 580,008 hectares (1,450,000 acres) were under cultivation, but the cultivated area extended, keeping pace with the increasing immigration, and in 1899 no less than 6,500,000 hectares (16,750,000 acres) were cultivated. One-half of the flour mills of the country are owned by immigrants, and of industrial establishments the great majority are owned and controlled by the foreign born. In 1895, 18,706 of the industrial establishments were owned by immigrants, and only 3498 by Argentines. About three-fourths (32,651) of the commercial establishments were owned by the foreign born, and one-fourth (11,449) by Argentines. It is estimated that one-half of the immigrant tradesmen are Italians.

"Immigration and Emigration in the Argentine Republic, 1857 to 1899."— An excellent summary of the immigration and emigration in the Republic during the the last forty-three years is presented under this head. In the last three years the average annual net addition to the population by immigration has been 50,000 persons. The maximum net increase was in 1889 when 248,365 immigrants were added to the population. The yearly immigration and emigration movements are admirably illustrated by a graphic diagram.

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"The Demographic Movement of the City of Buenos Aires, 1838 to 1899."— An attempt has been made to summarize the demographic statistics of Buenos Aires for the period 1838 to 1899. The births, marriages, and deaths have been taken from official records where such exist, but in the earlier years they are admittedly merely close approximations.

The average annual rates for the four quinquennial periods 1880 to 1899 were as follows: —

RATES PER 1,000 POPULATION.

Periods.	Births.	Marriages.	Deaths.
1880–84	33.0	6.9	22.9
1885–89	37.6	8.3	26.8
1890–94	43.4	8.9	24.7
1895–99	40.7	7.9	19.1

The maximum mortality during the period 1838 to 1899 was in 1871, and was caused by an epidemic of yellow fever, which cost about 15,000 lives.

It is interesting to note that the maximum marriage rate was in 1872, the year immediately following that of the fatal yellow-fever epidemic. It is a common observation that marriages occur in more than ordinary numbers immediately after war, famine, industrial depressions, or other national disasters and crises.

All in all, this second Bulletin is an exceptionally valuable publication, both on account of the information that it contains, and the methods employed to elucidate the data presented.

F. S. CRUM.

BULLETINS OF LABOR BUREAUS.

The quarterly *Labor Bulletin* of the Bureau of Statistics of Labor of Massachusetts for May, 1900 (No. 14), contains an article upon *Free Public Employment Offices.* Offices under state control were first established in this country in 1890 in Ohio, following, however, foreign precedents. One is maintained in each of the five leading cities of that state. The office maintained in New York was opened in New York City on July 20, 1896. In Chicago, three offices are

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maintained under an act passed by the Illinois legislature in 1899, and are administered in connection with the Bureau of Labor Statistics. Offices are maintained in Missouri and Washington. Offices established in Montana and California have been discontinued. In Massachusetts, private intelligence offices are maintained only under license and supervision.

The article gives detailed tables showing the work done by the Chicago offices from August 5th to December 16, 1899. "... The applicants of both sexes from 20 to 30 years of age represented 36.31 per cent of the total number of applicants; from 30 to 40 years of age, 24.51 per cent; from 40 to 50 years of age, 13.44 per cent; 50 to 60 years, 8.21 per cent; 60 years and over, 1.22 per cent; while for 1.12 per cent the age was not reported." Males, 20 to 30 years, numbered 3448, or 35.09 per cent; females, 20 to 30 years, were 1307, or 39.95 per cent.

The *Bulletin* for November, 1900 (No. 16), contains a study on *Three Leading Massachusetts Professions;* namely, religion, law, and medicine. Tables show the number engaged in each, for each city and town in the state. The totals for the state show for religion, 4597 (or one in 544 inhabitants), for law, 2781 (or one in 899 inhabitants), and for medicine, 5800 (or one in 431 inhabitants). These totals, however, include, beside those engaged strictly professionally, such other people as, in the capacity of clerk or official, gain their livelihood in these three general pursuits. "In Boston ... there is one person engaged in religion ... to every 415 persons in the population, the proportions in law and medicine being, respectively, one to 576 and one to 278. In ... a contrasting municipality, the proportions are, in religion, one to 325; in law, one to 4555; and in medicine, one to 414. In ... a typical industrial city, the proportions are one to 892 in religion; one to 2347 in law; and one to 804 in medicine. In a remote agricultural town ..., we find religion represented by one to every 304 persons ..., and law and medicine unrepresented ... In eight instances neither religion, law, nor medicine is represented in the resident population of the town. These eight places combined represent a population of but 3841."

The *Bulletin of the Bureau of Labor Statistics of New York* continues its summary of reports from labor organizations, statistics of building operations, immigration at the port of New York, reports of the Free Employment Bureau, agreements of labor organizations,

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decisions of the New York courts in regard to labor matters. In addition there have been some special articles of interest to readers at large.

March, 1900. — This contains a summary of the annual report of the Superintendent of State Prisons of New York for the fiscal year ending September 30, 1899, pp. 22–29; the Law of Boycotting, pp. 29–34.

June. — Arbitration of labor disputes, pp. 106–111; Saturday half-holiday movement, pp. 196–231.

September. — Tables on union wage rates and working time in 1895, 1897, and 1900, pp. 254–265.

CENSUS BULLETINS.

The following bulletins have been published by the Census Office of the United States: —

No. 1. April 17, 1899. Supervisors' districts, pp. 15.

No. 1a. January 2, 1900. Supervisors' districts, pp. 14.

No. 2. January 1, 1900. Statistics of manufactures, cities and towns withdrawn from enumerators, pp. 19.

No. 3. January 22, 1900. Names and addresses of supervisors of census, pp. 16.

No. 4. October 6, 1900. Population of New Hampshire by counties and minor civil divisions, pp. 5.

No. 5. October 20, 1900. Population of Alabama by counties and minor civil divisions, pp. 15.

No. 6. October 17, 1900. Population of Arizona by counties and minor divisions, pp. 3.

No. 7. October 3, 1900. Population of Arkansas by counties and minor civil divisions, pp. 14.

No. 8. October 8, 1900. Population of Delaware by counties and minor civil divisions, and of the District of Columbia, pp. 3.

No. 9. October 10, 1900. Population of Connecticut by counties and minor civil divisions, pp. 5.

No. 10. October 24, 1900. Population of California by counties and minor civil divisions, pp. 10.

No. 11. October 25, 1900. Population of cities having 25,000 inhabitants or more in 1900, pp. 15.

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No. 12. November 3, 1900. Population of Vermont by counties and minor civil divisions, pp. 5.

No. 13. November 8, 1900. Population of Massachusetts by counties and minor civil divisions, pp. 7.

No. 14. November 10, 1900. Population of Colorado by counties and minor civil divisions, pp. 12.

No. 15. November 16, 1900. Population of Hawaii by islands and districts, pp. 4.

No. 16. November 20, 1900. Population of Florida by counties and minor civil divisions, pp. 9.

No. 17. November 23, 1900. Domestic animals in barns and inclosures not on farms or ranges, pp. 99.

No. 18. November 28, 1900. Population of Idaho by counties and minor divisions, pp. 6.

BOARDS OF TRADE.

The following lists of Boards of Trade and Cotton Exchanges are taken from a recent report of Mr. George K. Holmes, Assistant Statistician of the Department of Agriculture, and published in the annual report of the Department for 1899: —

At least twenty-five boards of trade published statistics of the movement, distribution, prices, etc., of agricultural products, and the following is substantially a complete list of the cities in which these boards of trade are situated, the variants of the name being sometimes merchants' exchange, chamber of commerce, produce exchange, or commercial exchange: Baltimore, Md.; Boston, Mass.; Buffalo, N. Y.; Chicago, Ill.; Cincinnati, Ohio; Denver, Colo.; Detroit, Mich.; Duluth, Minn.; Indianapolis, Ind.; Louisville, Ky.; Memphis, Tenn.; Milwaukee, Wis.; New York, N. Y.; Omaha, Neb.; Peoria, Ill.; Philadelphia, Pa. (commercial exchange and also produce exchange); Portland, Ore.; Richmond, Va.; St. Louis, Mo.; San Francisco, Cal. (chamber of commerce and also produce exchange); Seattle, Wash.; Toledo, Ohio; and Washington, D. C.

Besides the foregoing boards of trade, there are many in the United States whose object is to stimulate concerted action by manufacturers, merchants, financers, and persons especially concerned in carrying on the distributive processes. About 800 of these boards of trade have

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a national association, which speaks powerfully for interests representing many hundreds of millions of dollars of capital, and which substantially represents the class of persons known as middlemen, who distribute the products of the farm. But this national association does not include all of the boards of trade, chambers of commerce, and produce exchanges. These in the aggregate number between 1300 and 1400, the largest number among the States being found in New York; second to which stands Pennsylvania; third, Ohio; and, fourth, Massachusetts.

There is a class of these boards of trade especially concerned with cotton, generally known as cotton exchanges, which are associations of middlemen with the object of obtaining information in regard to the condition of the market as influenced by demand, supply, production, available cotton, and, in some cases, of dealing in futures. The cities and towns where these exchanges are situated are as follows: Eufaula, Birmingham, Mobile, Montgomery, and Selma, Ala.; Little Rock and Texarkana, Ark.; Atlanta, Columbus, Rome, Savannah, and Augusta, Ga.; Monroe, New Orleans, and Shreveport, La.; Greenville, Greenwood, Meridian, Natchez, Vicksburg, and Yazoo City, Miss.; St. Louis, Mo.; New York, N. Y.; Newbern, Wilmington, and Raleigh, N. C.; Charleston and Columbia, S. C.; Memphis, and Nashville, Tenn.; Galveston, Dallas, Fort Worth, Sherman, Waco, and Houston, Tex.; Norfolk, Portsmouth, and Richmond, Va.

GENERAL REMARKS ON THE GUNSHOT WOUNDS OF 1898 AND 1899.

The following extract is taken from the annual report of the Surgeon-General of the United States Army: —

Of the 4919 men injured by gunshot during the years 1898 and 1899, 586 were killed and 4333 were wounded and received into the field and other hospitals. The killed constituted 11.9 per cent of those struck, the wounded 88.1 per cent. In other words, 1 man was killed for every 7.4 wounded. The Mauser bullet must therefore be regarded as less deadly than the larger missile used during the Civil War. The medical and surgical history of the Civil War shows the following casualties: —

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	Killed.	Wounded.
United States troops,	59,860	280,040
Confederate troops,	51,425	227,871
Total,	111,285	507,911

In percentages the casualties were: Killed, 17.97; wounded, 82.03; or 1 man killed to every 4.56 wounded. The relative proportion of killed was therefore considerably larger during the Civil War than during our recent experiences. It is to be noted also that many of the wounds of the past two years were made by missiles of large calibre. Of those reported in 1899, 471 were specially stated as having been caused by the Remington bullet of calibre .45. It is safe to say that had the whole number of wounds received been inflicted by the smaller Mauser or Krag-Jorgensen bullet the percentage of immediately fatal wounds would have been materially lessened.

The less deadly character of the injuries inflicted by the modern bullet is manifested also when we exclude the killed and regard only those wounds which came under the care of the surgeons. Of these, during the two years, there were 4333, and 259 of the patients, or 6 per cent of the whole number, died. The corresponding percentage from the records of the Civil War was 14.3. Table C in Part I of the medical volume of the *Medical and Surgical History of the War of the Rebellion*, shows that among the white troops of the army there were borne on the reports of the sick and wounded 230,018 gunshot wounds, of which 32,907, or 14.3 per cent, proved fatal. The marked reduction of the ratio of killed to wounded may be placed to the credit of the small-calibre bullet; but the lessened mortality among the cases which came into the hospital may not wholly be attributed to the humane character of the wounds inflicted by this missile. Due credit must be given to the improved surgical methods of the present day. Wounds of any region of the body may be taken in comparison and the result will always be found to show a decided lessening in the percentage of cases ending fatally among those of the past two years, as compared with those of the Civil War. Take, for instance, gunshot wounds of the femur. During the Civil War surgeons in the field hospitals regarded a fractured femur as a serious menace to life, the danger from which was believed to be materially lessened by an immediate amputation. The field hospital surgical work after a battle consisted in great part of amputations, excisions, and resections. Of 6576 fractures of the femur, 2923 cases were treated by primary amputation, 186 by resection, and the remaining 3467 by conservative or expectant measures, this conservative action being due in many

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cases to a want of favorable conditions for the performance of primary operations. The limb was promptly amputated in 44.4 per cent of these gunshot fractures.

On the other hand, during the past two years 82 cases of gunshot fracture of the femur were reported, 6 of which were treated by primary amputation, and 2 by resection; the remaining 74 cases being treated by conservative methods, not because the conditions were not favorable for the performance of primary operations, but because of a conviction that under present methods of treatment the limb could be preserved without adding materially to the danger to life. The limb was lost through surgical intervention in only 7.3 per cent of the cases.

Not only limbs but lives were saved by the surgical practice of the past two years. In the 82 gunshot fractures of the femur the upper third was involved in 32, of which 5 were fatal; the middle third in 27, of which 3 were fatal; and the lower third in 23, of which 1 was fatal. The mortality varied from 4.3 per cent of the cases in which the lower third was fractured to 15.6 per cent of the cases in which the upper third was the site of the injury, whereas the corresponding percentages of fatal cases during the Civil War were, respectively, 42.8 and 49.7. The whole of the lessened mortality in these serious fractures may be credited to the protection given to the wound by the first-aid dressing, and to the care exercised in the subsequent aseptic treatment of the fractured limb.

In penetrating wounds of the thorax the rate of mortality fell from 62.6 per cent during the the Civil War to 27.8 per cent during the years 1898 and 1899. The Civil War reports show 8403 cases in which the results were determined; 5260 deaths occurred among the number. The reports for the later years, as already stated, show 198 cases, of which 55 were fatal.

There were during the Civil War 3475 penetrating wounds of the abdomen in which the ultimate results were determined; 3031 of these, or 87.2 per cent of the total, proved fatal. During the years 1898 and 1899, 116 cases, 81 fatal, were recorded; the fatal cases constituting 70 per cent of the total. Of 10 cases in which laparotomy was performed, 9 were fatal.

The alteration in the percentages of mortality in fractures of the cranium is less marked than in wounds of other parts of the body. Of 4243 cases of cranial fracture during the Civil War, 2514, or 59.2 per cent, were fatal. In 1898 and 1899, 68 cases were recorded, with 37 deaths, the latter forming 54.4 per cent of the whole number.

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Publications of the American Statistical Association.

The New Series of the Association, issued quarterly, will be sent to members of the Association on payment of the annual assessment of two dollars. The subscription price is also two dollars per annum. Separate copies can also be purchased upon remittance of the advertised prices.

VOL. I. 1888–1889. NOS. 1–8. Pp. 492.

As No. 4 is out of print it is impossible to furnish this volume complete. Price, without No. 4, $3.50.

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CONTENTS.

I. Advertising in the United States. *By Sidney A. Sherman, Ph.D.* 120

II. The Practical Use of Vital Statistics. *By Frederick L. Hoffman.* 163

III. Miscellany and Notices: —

Classification of Causes of Death. *C.-E. A. Winslow.* 176

Employer's Liability. *Miles Menander Dawson.* . . 180

Quarterly Bulletin: Bureau of Economic Research. *E. H. D.* 183

Vital Statistics of the Army. *C.-E. A. W.* 185

Notes on Vital Statistics. *C.-E. A. Winslow.* . . . 187

A Mathematical Analysis of the Curve of Deaths at Different Ages. *C.-E. A. Winslow.* 195

Michigan Vital Statistics. *S. W. A.* 197

Census of Hawaii. 198

School Attendance in Rhode Island. 199

Notes. 200

Statistics of Housing Accommodation. 203

Inaccuracy of Trade Statistics. 205

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AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, No. 52. DECEMBER, 1900.

ADVERTISING IN THE UNITED STATES.

By Sidney A. Sherman, Ph.D.

Advertising in the United States may be conveniently described under three heads,— the mediums used, the things advertised, and the advertisers and their organization.

THE MEDIUMS USED.

The periodical press overshadows all other mediums of advertising, and is the first to engage our attention. For the last fifty years the daily newspapers have constituted almost exactly ten per cent of the whole number of periodicals. In 1899 they numbered 2128 in a total 21,269. In 1890 their circulation was twelve per cent of the total circulation of the country. Advertising in the daily papers is chiefly local. It consists of the advertisements of retailers, real estate brokers, financial institutions or firms, legal notices, entertainments, and situations or help wanted, besides miscellaneous notices too numerous to be classified. Advertising by outsiders is mainly done by the manufacturers of patent medicines, beverages, and foods, and by the great transportation companies. The amount of this class of advertising in the daily papers is increasing, and the increase is one of the most noticeable tendencies recently apparent.

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The great body of periodical publications has always been issued weekly. During the last sixty years weeklies have maintained a pretty steady proportion of the whole number of periodicals in the United States, being 70 per cent in 1840, 75 per cent in 1850, 78 per cent in 1860, 73 per cent in 1870, 76 per cent in 1880, 72 per cent in 1890, and 73 per cent in 1899. A distinguishing feature in the country weekly is the "patent insides and outsides," begun in England as early as 1850, and in this country about 1860. "Plate matter" is another economy of the same nature, the plates instead of the printed papers being sent to the local publisher. In 1880 there were 3232 such weeklies, having an average circulation of 608 each, and in 1899 there were 7600.

Country weeklies stand in the same relation to their communities as the dailies to the cities. They form the sole periodical medium for the local advertiser, and depend largely upon his patronage for their existence. But, as in the case of the dailies, the amount of outside or "foreign" advertising which they carry is increasing.

According to the census of 1890 the sum of $126,000,000 was invested in the daily and weekly newspapers of the United States in that year. At the present time the sum is probably a half greater. There are now several metropolitan papers valued at not less than $3,000,000 each. In 1890 more than one hundred thousand persons were employed by the newspapers of the country to whom was paid $70,000,000 in wages annually.

The newspaper revenue amounted to $143,000,000 and was about equally derived from the two sources, subscriptions and advertising. In 1867 the estimated receipts from advertising were $10,000,000; in 1873, $15,000,000; in 1880, $39,000,000; and in 1890, $71,000,000. The gain from 1880 to 1890 was 82 per cent. This ratio has probably increased during the last decade, and the total for the year 1900 will be well on towards the $150,000,000 mark.

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The monthly magazines have been the most striking feature of the press during the last twenty years. From 1880 to 1890 they increased 93 per cent in numbers, which was a much greater percentage than that of the dailies or weeklies. Their average circulation rose from 7834 to 11,317, and here also the increase was more rapid than in the case of the other two classes of periodicals. Since 1890 their increase in numbers has been slow — from 2247 to 2309, but their circulation has grown prodigiously. This has been due to the establishment of the new ten-cent magazines and the great reduction in price of the older ones.

The circulation claimed by the 160 leading monthlies varies from 5000 to 1,250,000, aggregates 25,100,000, and averages about 157,000 each. That is one and a half for every family in the United States. One-half of them claim a circulation of 100,000 or over. Fifty-eight, or about three-eights of the whole number, are published in the city of New York. Boston has 15, Philadelphia 12, and Chicago 10. Fifteen are published in the state of Maine, and claim a combined circulation of 5,600,000. By the census of 1890 Maine ranked third in the circulation of its monthlies. Needless to say, not all of these are of the highest class, some of them being on the *index expurgatorius* of the Canadian postoffice.

The magazines began to be used for advertising about the time of the Civil War. The first advertisement appeared in the *Atlantic Monthly* in February, 1860, and in *Harper's* in July, 1864. During the last ten or fifteen years this advertising has taken on a new character and increased immensely. The greatest skill in composition is joined with constant improvement in the processes of illustration, so that the advertising pages have become as attractive as the literary portion. It is a commonplace, not much exaggerating the fact, that "everybody reads the advertisements first."

The following table, made up from magazines taken at random, shows the relative amount of advertising and reading matter: —

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	Pages Advertising.	*Pages Reading.*
Century, July, 1889,	68	158
Scribner's, June, 1890,	106	130
Review of Reviews, April, 1895,	71	126
McClure's, November, 1897,	139	96
Century, November, 1898,	102	160
Harpef's, October, 1899,	112	168

In none but the *Century* for July, 1889, was the advertising less than half the reading, and the average is five pages of advertisements to seven of reading. Without doubt the thing is being overdone, and there are already indications of a reaction. One of the best monthlies never inserts more than one page of advertisements to two pages of reading.

To illustrate the growth of magazine advertising the following table is given, showing the number of pages of advertisements, and number of advertisements, in *Harper's Magazine*, since their first appearance in it in 1864, taking the month of October wherever a copy of that month's issue was accessible: —

Date.	Pages Ads.	Number Ads.	Date.	Pages Ads.	Number Ads.
1864	3 1-4	11	1885	11 1-2	62
1865	2	5	1886	20	97
1866	3	19	1887	37	135
1867	6	30	1888	54	193
1868	7 1-3	20	1889	48	237
1869	5 1-3	35	1890	75	348
1870	4 1-2	21	1891	113	409
1871	3 1-2	30	1892	90	403
1872	2	20	1893	84	307
1873	1	7	1894	76	353
1874–80	No advertisements.		1895	80	374
1881	Not accessible.		1896	76	329
1882	1 1-4	15	1897	81	348
1883	8 1-2	53	1898	83	330
1884	8	43	1899	112	322
			1900	110	294

Reading matter ranged from 136 pages in the earlier numbers to 168 in 1899. The proportion of advertising was insignificant until after 1885. The effects of hard times on

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advertising could have no stronger illustration than the blank years 1874–1880; and it is marked in the years following 1892.[1]

While the periodical press may be considered as the main part of the great stream of printed advertising, its volume is swollen by tributary streams, and by occasional and somewhat irregular down-pourings. Of this occasional literature we may distinguish six classes — the almanac, the calendar, the handbill, the circular, the catalogue, and the booklet.

Almanacs, first sent out by insurance companies in England, have long been in use as advertising mediums.[2] They are especially favored by the patent medicine manufacturers. In St. Louis alone half a dozen of the largest firms send out annually two million almanacs each. The total output of that city is about 20,000,000 yearly.[3] But this is put in the shade by the issue of *Ayer's Almanac* in 1898, which is said to have been 25,500,000 copies.

Similar to the almanac in its nature is the calendar, which has had great popularity. Its value lies in the facts that it lasts a long time, is kept in a conspicuous place, and is constantly referred to. The insurance companies are the largest users of calendars, some companies spending as much as $20,000 a year upon them. Local printers, coal dealers, and other advertisers give them to their customers, and sometimes to all who call for them.

As its name implies, the handbill is given out by hand on the street or at the door. Its use is mainly local, for some special sale of merchandise, for auctions, and for entertainments. It consists of a single leaf printed on one side only. It was formerly much used, and at the closing out of the English lottery in 1826 was distributed by the million. The

[1] For the privilege of using his files of *Harper's* I am indebted to Mr. J. B. Humphreys of Providence. The practice of libraries, and of some publishers, of binding magazines without the advertising pages, is to be deplored; for they are invaluable in the study of social conditions.

[2] *Every Saturday*, June 6, 1868.

[3] A. C. Cantley, *Printers' Ink*, August 17, 1898.

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daily newspaper has largely taken its place, and it is consequently much less used in cities than in towns and villages.

A good deal like the handbill in its character is the circular, being used on special occasions, particularly to introduce some new book, a new type of standard article, or as a condensation or selection from a catalogue. The loose "inset" leaf or leaves, so much in vogue in Great Britain, placed in magazines, is properly a circular, since the magazine acts merely to distribute it. Both hand-bill and circular are often simply price lists.

Catalogues are expanded price lists, differing from them in that they are more fully descriptive of the goods advertised. They were originally for distribution among the trade, but have now gone beyond that, and are at present distributed by the million to consumers. The catalogue of one "mail-order" house has over a thousand pages, and contains descriptions of over 75,000 different articles; in another more than 100,000 articles are listed. Numbers of firms selling at wholesale in the cities of Boston, New York, and Chicago have discarded traveling salesmen altogether and are now selling by catalogue.[1] This is a movement the possibilities of which are of the greatest importance in the commercial world.

The booklet is a recent development among the means of advertising. It is generally used either to describe some single article or line of goods, or to describe a factory or process. It is prepared with great attention to style, typography, and illustration. The advertising experts find here a favorite field for the exercise of their abilities. Booklets are at present in great favor among advertisers and the public because of their attractive appearance and the terse style of the English used in them.

Lithographed work has the picture as its chief feature, supplemented by appropriate reading matter. The litho-

[1] *Profitable Advertising*, August 15, 1898, p. 128.

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graphs are distributed in packages of goods, and by dealers at the store, or they are hung up in conspicuous places.

Advertising in street, roadside, and field, technically called "outdoor advertising," is carried on by means of store signboards, posters, painted signs, small movable signs, stereopticons, electric signs, and by various devices in air and water.

Signboards on the store are among the oldest and most permanent forms of advertising. It is estimated that there are $3,000,000 worth of signs in the city of New York alone, and that the brewers of that city furnish the saloons with $500,000 worth of signs each year. There is a regular craft of sign making.

Posters are of ancient origin. Callades, a Roman artist, is said to have depicted actors in their favorite parts upon the *alba* on the walls at Rome.[1] Posters have always been the special advertising medium of the theatre and other entertainments. P. T. Barnum began their use in this country about 1840, and was soon followed by the other circus managers.[2] Since the Civil War they have come to be used to advertise goods, and within a few years these "commercial" posters have begun to predominate.

Artistic posters arose in France about 1836.[3] Cheret, who is called the father of the modern poster, began his work about 1867, and during the last quarter of a century great attention has been given to the making of posters there. It is said that there are over two hundred artists in Paris engaged in this work. In all Europe and in America there has been a "poster fad." Extensive collections are made by the devotees of the cult. Many exhibitions of posters have been held, local, national, and international. While much of this effort has been abortive, yet it has on the whole appreciably raised the standard of poster making, very markedly so in France, where an inartistic poster is said to be soon torn down.

[1] *Pictorial Posters*, by Charles Hiatt, London, 1895.
[2] *Printers' Ink*, September 14, 1898.
[3] *Pictorial Posters*, by Charles Hiatt, London, 1895.

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Billboards, or hoardings, as they are called in England, are the usual means of displaying posters. In the early period of the business it was one in which individual initiative had full scope.. The billposter placed his bills where he dared, by day or by night, running his chances of their being torn down by the irate owner or posted over by his competitor. There is now usually one billposter or company in each city, although in the larger cities there are sometimes competitors. There are several general billposters of large capital in the United States who employ an army of men and own space and have facilities for covering any state or number of states. They have brought billposting to a science.[1] A posting machine has recently been invented which can be operated by one man.[2]

In England there is a "Society of United Billposters" numbering 600 members.[3] In America there are state and sectional associations, and also the "Associated Billposters of the United States and Canada." The latter hold an annual meeting, make rules for the regulation of the business, and fix a schedule of prices which depends upon the size of the city in question, the number of sheets in the poster, and the length of time it runs. There are about 700 members in it, and about 3500 in the local associations.[4] There are two monthly journals, both very creditable in their contents and general tone. Attempts have been made to start a billposting trust, and a corporation was formed with this intent in New Jersey in September, 1899.

Street car advertising has been in existence in the United States about twenty-five years. It has seen a great increase during the last ten years, and is now thoroughly systematized and consolidated in the hands of a few firms which purchase the advertising rights of the street car companies by the year.

[1] Fowler, 764–65..
[2] *Printers' Ink*, August 23, 1899.
[3] *Publicity*, Hull, England, August–September, 1899.
[4] *Printers' Ink*, August 23, 1899.

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The rates vary from one cent a car per day upwards, according to the length of the contract and the number of passengers carried. One of these companies claims to control 14,000 cars in 100 cities; another controls over 4500 cars in 40 cities. A regular system of inspection is maintained by large advertisers to see that the cards are in their places and are not defaced. Steam passenger cars are not used for advertising purposes in the United States. There are, however, special advertising cars, such as those of Montgomery, Ward and Co. of Chicago, and the theatre and circus advance agents. The outside of freight cars has long been used by shippers to display large cards and posters while *en route*. Sometimes a special train is made up by a single large manufacturer, and the whole is made a moving advertisement whose coming is heralded in each city and town through which it is to pass. One large western railroad system has now restricted freight car advertisement to a card or poster not to exceed very moderate dimensions. It is to be hoped that the bewildering maze of cards with which the inside of English railroad stations is plastered will not find its counterpart in the United States.

In retail merchandising, store and window display is second only to the newspaper in its importance as a means of advertising. The spacious and well-lighted store, with convenient floor plan, the systematic and attractive arrangement of goods upon shelves and counters, plainly ticketed with name and price, the general neatness of the clerks and surroundings — all act as a standing invitation to the public to come in and buy. Special displays of the goods in the stores are made at "openings," held at seasonable times. Crowds throng the store on such occasions.

Window decorating has seen a phenomenal development within a decade or two, especially in the large stores of the cities. It has become a vocation, recognized and well paid by merchants. There are about 1500 men in the United

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States who are engaged in it,[1] besides thousands of merchants and clerks who devote a portion of their time to this work. The National Association of Window Trimmers held its first annual meeting at Chicago in August, 1898.[2] It has members in almost every state. There are two journals exclusively devoted to the subject.

Under the head of personal advertising we shall consider that class of advertising in which the individual person, by his voice, by gestures or other actions, by wearing or carrying the advertisement, or by showing goods which he carries with him, attracts the desired attention. The public crier of ancient days exists only as a relic, but the individual peddlers, crying their own wares, still flourish, and in the United States have largely increased in numbers in recent years. There are the hawkers of fruits and vegetables, so numerous in the summer season; the peddlers of small wares; the soap peddlers and collectors of refuse; the itinerant tradesmen, like scissors grinders and umbrella menders; the venders of quack medicines and novelities who take their stand in the street or public square and advertise their wares by word of mouth; and, finally, newsboys on the streets and in the railroad trains.

Sandwich men, or "banner packers," as they are known to the craft, were common in London fifty years ago,[3] and doubtless had existed much earlier. From one to fifty men parade the streets and form a conspicuous advertisement. There are estimated to be from 1000 to 1200 sandwich men in the city of New York alone.

"Demonstrators" have become an important factor in advertising during the last few years. Manufacturers employ them, sending them about from city to city and from fair to fair by schedule, often having a score or more at work continually. Demonstration is for the most part done by young

[1] *The Show Window*, October 10, 1898.
[2] *Art in Advertising*, September, 1898.
[3] *Dublin Review*, September, 1849.

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women. A school has been established in Boston which teaches and finds places for demonstrators, for whom, if capable, there is an active demand among the large advertising firms.[1] It is estimated that there are now 10,000 demonstrators in the United States.[2]

Commercial travelers have a double function, advertising and selling. The proportion in which the two are combined varies in different businesses, according to the amount of advertising done in other ways. The tendency is, as far as possible, to substitute printed matter for the oral representations of the commercial traveler, and to sell by means of order blanks sent with trunks of samples, or by illustrated catalogues. In 1898 there were 28 large houses in New York, 17 in Boston, 21 in Chicago, and many in other cities which had discarded "drummers" altogether and sold only by catalogue.[3]

The Commercial Travelers' National League is a strong general organization, besides which there are numerous organizations by localities and by lines of goods. The census of 1890 returned 58,691 persons engaged in the business. The president of the league, in his testimony before the Industrial Commission, June 16, 1899, stated that those figures were grossly incorrect, and that in 1899 there were 350,000.

The means of advertising all resolve themselves into two classes, in the first of which the goods themselves are placed before the potential buyer, and in the second a representation of the goods is made. Under the first head come store and window display, most "personal" advertising (*e. g.*, demonstrators and commercial travelers) and the distribution of samples at the house and at fairs. This method is most primitive, and has its types in the fairs, markets, and traveling packmen that have existed from early times. Naturally oral description goes with it. Written description was next

[1] *Printers' Ink*, "Boston Correspondence," October 19, 1898.
[2] F. A. Heywood in *Printers' Ink*, July 12, 1899.
[3] *Profitable Advertising*, August 15, 1898.

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in development, but did not go far until the art of printing was perfected. Pictures have always been used in a rude way, but not advantageously or effectively until recent years.

Of all the mediums described the periodical press easily stands first in importance. Store and window display is doubtless a better means, for both buyer and seller, but it is limited in its application. The printed page goes everywhere and at a minimum of cost.

THE THINGS ADVERTISED.

We shall now view our subject from another standpoint—the nature of the things advertised. Raw materials and unfinished products do not play a conspicuous part in advertising. The reason appears to be that they are generally produced and sold by the many but bought and used by the few, and advertising exists only where the many buy and use.

The means of transportation have long been advertised. The first stage coach notices in England appeared in the year 1658, almost two centuries and a half ago. Until recent years this advertising has been done in the form of notices of the departure and arrival of stage coaches and other vehicles, of vessels for domestic and foreign ports, and railroad time tables. Shipping notices were numerous in the American papers of the 18th century; and they have always been a feature of the first page of *The Times* in London.

Today, in addition to the mere statement of fact of the time-table type, we find railroad and steamship lines using all the mediums and devices known in order to attract passengers, and often adopting those general and far-reaching methods which are indirect and distant in their results.

A certain great system prints in newspapers sketches of its line by well-known literary men. When a paper prints a good description of a town on the line the company buys hundreds or thousands of extra copies. Every year one or

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more press associations travel over the line as its guests. The company publishes a monthly paper of which 50,000 copies are sent to possible buyers of land. It also issues books of farming, summer resorts, and shooting and fishing. It uses lithographs, posters and hangers where people are illiterate or papers few. Photographs of landscapes, industrial enterprises, and people are prominent in its advertising. It has sent a company of entertainers and a biograph show through parts of the country; fox hunts and conventions of settlers and insurance agents are other features.

Industrial agents in every town along the line answer inquiries concerning their locality, and induce owners of property near the road to keep it neat and attractive. The station agents beautify the stations and their surroundings, grass plots and flower beds being carefully cultivated. Circulating library cars visit each town once a month, and an industrial train in spring and fall, when lectures on soils, planting, etc., are given, improved implements are shown, and demonstrations in canning are given. By these indirect means, far reaching in their nature, and the more powerful as they are remote from the end in view, do the great railroad lines make themselves known to multitudes of people. The volume of freight advertising is much less than that of passenger advertising. The reason for this is the fact that freight traffic is incapable of that stimulation to which passenger traffic, involving personal gratification and luxury to so large a degree, is susceptible.

Finished products, or "consumer's goods," are the subjects of the great bulk of advertising. Among foods the advertisements of canned fruits and vegetables and pickles and preserves of all sorts are very prominent in the magazines and street cars, and on posters and painted signs. A well-known sauce firm contracted in April, 1899, to have five hundred and seventy cities in the United States posted for three months with an "eight-sheet" poster advertising a

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single product; the cost was $50,000.[1] Another pickle, sauce, and preserve firm, whose factories and warehouses cover 23 acres, employs 272 traveling salesmen and many demonstrators, and uses millions of lithographed cards, hangers, calendars, etc., and an immense amount of street car space. Its operations extend over all English speaking countries on the globe and all Latin America besides. It made an extensive exhibit at Paris, distributing several million samples.[2]

Cereal foods are widely advertised. Several companies spend in the region of $500,000 a year each, and their products have become household words. Some of them are international advertisers on a great scale. Cooked cereal foods have also entered the field. The latest and greatest advertising exploit in this line is that of the National Biscuit Company; $100,000 worth of advertising was contracted for, mainly in newspapers and posters. It began in January, 1899, and in a few weeks the factories were 480,000 orders behind, and the company was compelled to stop advertising for a time in order to catch up.[3]

Tea, coffee, and cocoa have been advertised in England for two centuries and a half, they being among the earliest merchandise to be offered for sale in the newspapers. The leading tea dealer has become an international character through his tea advertising, which extends over all English speaking countries. Others are scarcely less widely known. Coffee has recently been advertised on a larger scale than ever before in the United States, partly because of the competition of the various substitutes, but more because of the contest between rival producers. Cocoa and chocolate manufacturers are among the most extensive of all advertisers. French, Dutch, English, and American brands rival each other in their claims to public attention. Numerous preparations of cereals as substitutes for coffee have been placed

[1] *Printers' Ink*, April, 1899.
[2] *Ibid.*, November, 1898, p. 22.
[3] *Western Advertiser*, July, 1899.

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upon the market during the last fifteen years, and a few of them, advertised on a national scale, seem destined to be more than temporary. One at least is reckoned among the largest advertisers in the country.

Baking powder has long been prominent in all mediums of advertising. Intense rivalry existed among the baking powder companies for many years, accompanied by a most extraordinary amount of advertising. Now that the large companies have combined the advertising continues without much abatement. The great trade in certain brands was built up by long advertising, and in order to maintain these brands in their position that advertising must go on. The Royal Baking Powder Company is said to have spent $800,000 a year.[1] What the combined companies spend it is too early to ascertain. The business is of international extent. They use "practically every newspaper in the world." In Mexico one brand has been so well advertised that its name is a synonym for baking powder.[2] It was one of the pioneers in international advertising.

Liquors and tobacco, appealing to the appetites, being of general use, and of great variety as to kind, quality and form, offer one of the most favorable subjects of advertising. The advertising of beer has grown with great rapidity, as it is a relatively new beverage in America. Several companies rank among the most extensive advertisers in the world, for they operate on an international scale. At least one of them spends $500,000 a year.

Tobacco, being in more general use than liquors, offers an even wider field; and being less under legal and moral ban, its public advertisement is more extensive and more general than that of liquors. With the growth of large manufacturing companies, each pushing its own brand of cigars, cigarettes, and tobacco, the advertising increased rapidly.

[1] C. A. Bates, "Short Talks on Advertising."

[2] *Printers' Ink*, August 9, 1899, from Mexican *Herald*.

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The formation of the American Tobacco Company does not appear to have much diminished the amount, if at all. This may be partly owing to the existence of very large and powerful competitors outside the trust, but far more, without doubt, to the necessity of keeping the names of established brands before the public. Moreover, the company has had success far beyond its expectations with certain new brands of cigars which it has advertised extensively, and is now going forward in this line on a great scale. It is said to have appropriated $600,000 for advertising cigars alone in 1900.[1] During 1899 the advertisement of a single brand of cigars appeared on the billboards of every city and town in the United States for three months at a cost of $300,000.[2]

No department of advertising presents such interesting phenomena as that of patent medicines. Of the history of modern advertising since its beginning in England in the time of the Commonwealth, medicinal advertising may well say *quorum magna pars fui*. Beginning with its beginning, growing with its growth, medicines have remained its most constant factor, and today the largest advertisers in the world are patent and proprietary medicine makers. One of them is reputed to be spending $1,250,000 a year in newspaper advertising alone. His order for albums for 1899 was seven million copies.[3] The next largest firm spends upwards of a million a year. They advertise in all the principal countries on the globe. All Europe, North and South America, Asia, Africa, and the islands of the sea are invaded by them. They have a factory in the city of Mexico and one in Cuba. They advertise in practically every newspaper in the Central and South American countries, besides which they themselves publish a newspaper in each country and send it to sections in which the local newspapers are not well distributed.

[1] *Profitable Advertising*, September, 1899.
[2] *Profitable Advertising*, August, 1899.
[3] *Publicity*, May, 1899.

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Millions of cards are also distributed by them annually in these countries.[1]

A considerable number of companies spend half a million a year. The general manager of one of them thus describes the way in which his company's appropriation was to be divided in 1899: "About $300,000 will be spent with the daily and weekly newspapers; about $50,000 with magazines and illustrated weeklies; about $50,000 with medical journals and other scientific and semi-scientific publications; about $50,000 in signs, billposting, and the like; and about $50,000 in the distribution of lithographic pamphlets, circulars, etc. It will cover all the large cities of the United States, Canada, Great Britain, and some smaller countries."[2]

About one-third of the total sales of retail druggists is made up of medicine.[3] Of 2583 general advertisers using the magazines and general weeklies, and tabulated by *Press and Printer* from January 1st to October 29, 1898, one-sixth of the whole number, 425, were makers of proprietary articles. Of 74 pages of advertising in the *Strand Magazine* for Christmas, 1898, patent medicines and remedies occupied 32 pages.[4] They occupy a large fraction of the space in the dailies taken by "foreign" (that is, not local) advertisers. Thus, 13 out of 23 "foreign" advertisements in the *Providence Journal* for January 26, 1900, were of this class.

One of its peculiar features is the publication of testimonials. Every large company accumulates thousands of them, which it publishes widely. The *New York Sunday Herald* for April 16, 1899, contained six pages of testimonials to the merits of a single medicine, and the *Journal* contained five pages. This was overwhelming in its magnitude, and is probably without parallel. The cost of the two was $9000.[5] Testimonials from prominent people are

[1] *Printers' Ink*, February 22, 1899, quoting *Advertising Experience*.
[2] *Profitable Advertising*, April, 1899, pp. 606-07.
[3] *Printers' Ink*, July 19, 1899.
[4] *Publicity*, January-February, 1899.
[5] *Printers' Ink*, May 3, 1899.

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much sought and, it would appear, easily obtained, generally for a consideration. Men holding political positions and the owners of professional titles are apparently not averse to turning an honest penny in this way.

The free distribution of samples is another method much used by the patent medicine makers. It has given rise to a host of distributers, general and special, all over the country.

There are over two hundred soap concerns of fair size in the United States, a dozen of which are large advertisers, as are several English firms. There has been keen competition among them, resulting in the adoption of many schemes and devices to sell their goods. They are large users of lithographs, painted signs, tacked signs, picture cards, etc. One plan has been to give a sum of money to every church, philanthropic society, and the like, which collected a given number of coupons to be found only in the packages of soap. One company gives an article of furniture with every order for soap of a certain amount. Its sales are chiefly by mail.

A Chicago firm is stated to have contracted for $200,000 worth of advertising in western newspapers alone in 1899.[1] Several others spend from $300,000 to $500,000 a year,[2] and *Pears'* must be near the million mark. Many millions altogether are expended every year for soap advertising. In the summer of 1899, when the attempt was being made to form a trust, it was stated in the public prints by the promoters that $30,000,000 a year was thrown away by the soap manufacturers in this way. The amount was exaggerated, but one-half that sum would probably be within bounds.

Toilet articles appeal especially to women. They are advertised in the monthly and weekly periodicals, particularly women's papers, on the billboards, and in the street cars. The annual expenditure of one concern is $150,000 a year;[3] that of another is estimated at $200,000.[4]

[1] *Printers' Ink*, June 28, 1899.
[2] *Printers' Ink*, March 1, 1899, citing *The Advertising Man*.
[3] *Ibid.*, May 17, 1899.
[4] *Ibid.*, March 1, 1899.

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Much general advertising of clothing has sprung up in recent years. Shoes are being especially exploited at the present time. A full back cover advertisement of a shoe for women recently appeared in a popular monthly at a cost of $4000 for the single issue. One of the best known advertisement writers expended $100,000 in advertising a certain shoe leather.[1] The manufacturers of a new shoe have contracted with an advertising agency to spend $50,000 a year for ten years in newspapers and trade journals to push the shoe in the United States and foreign countries.[2] In August, 1899, the advertisement of a well-known shoe began to appear in 7750 papers supposed to reach about 25,000,000 people in this country.

The general advertising of undergarments was begun about twenty years ago by a single firm acting as concessionaries of a German house. In a few years rivals sprang up, and today there are many advertisers of these goods of both foreign and domestic make. In *McClure's Magazine* for November, 1897, eight different ones appeared. The general advertising of men's clothing began about fifteen years ago. From 1889 to 1892 it was carried on on a large scale by one firm which expended from $75,000 to $80,000 a year. Since then men's suits and overcoats have become widely advertised by houses devoted to that line of goods, and by the mail order houses. A large wholesale hat firm in New York sells to retailers by means of circulars containing half tones of their various styles of hats. The retailers order from the circulars, and thus the firm saves the cost of the commercial travelers formerly employed. It claims to make a net saving of $18,000 a year by this means.

Among household implements sewing machines are advertised on a gigantic scale. They are used in the factory as well as in the home, but are preëminently a domestic imple-

[1] *Profitable Advertising*, October, 1899.
[2] *Ibid.*, April, 1899.

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ment. One company sells 800,000 machines a year through its agencies in every city in the entire civilized world, employing 50,000 canvassers.[1] For a long time the company printed a monthly paper of its own — 1,000,000 each issue — and was a liberal patron of lithographing. It exhibits at all the great expositions, and uses almost every kind of newspaper, but its greatest advertising medium is the 50,000 canvassers. There are few if any instances in general merchandising in which the personal medium counts for more. The advertising outlay of this company is the largest in the world, amounting to several millions annually.

Fuel is not largely advertised, as the coal producers are to all intents and purposes a trust, agreeing together upon output and prices. Local dealers advertise to a moderate degree, and there are occasional examples of extensive local advertising.

Gas and electric lighting companies have as yet advertised but little, being generally secure in their monopolies, but already some of them are beginning to see that by advertising they can increase their business and profits, and are acting accordingly. A notable instance is that of the gas company in Philadelphia.

We now pass from those things which satisfy the primary needs for food, clothing, shelter, and care of the body, to articles used for recreation, and to satisfy the artistic and intellectual sides of human nature.

During the last decade vast sums have been spent in advertising the bicycle. Since 1889, when they first appeared there, the average number of bicycle advertisements in *Harper's Magazine* has been 6; in 1896, when the height was reached, there were 15. Every class of periodical is used, as well as the other means of advertising. Racing teams are a striking feature. In 1894 one firm spent $20,000 in selling 5000 bicycles; in 1895, over $75,000 to sell 20,000; and in 1896,

[1] *Printers' Ink*, June 14, 1899.

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$145,000 to sell 40,000. Of the last, $10,000 was for catalogue, and $10,000 for racing team.[1]

Of the 2583 advertisements classified by *Press and Printer*, 266, or a little over ten per cent, belonged in the category of art products. These articles appear mainly in the magazines and weeklies. The advertising of silverware, musical instruments, and cameras is most prominent, there being numbers of firms of national reputation advertising in the standard papers, besides many which make a specialty of goods which are sold through the medium of the mail order journals.

For some years cameras have been quite widely advertised in the general mediums of all grades. In *Harper's Magazine* they were first advertised in 1884, and reached their height in 1889. The largest company now in existence, started in 1888, is capitalized at $5,000,000, and is estimated to spend about $750,000 a year in advertising.[2] This company gives prizes for pictures taken with its cameras. One year it held two exhibitions, one in New York and one in London, at a cost of $50,000. The name and catch phrase coined by this company have become a part of the vernacular.

Books, periodicals, and writing materials form about 15 per cent of the advertisements classified by *Press and Printer*, and the three were almost exactly equal in numbers, being 130, 128, and 124, respectively. For mediums by which to reach the public they are pretty closely limited to the magazines and general weeklies.

Books formerly depended very largely upon the personal medium for their advertising,— that is, upon agents and solicitors. Many well-known standard works of reference, as well as multitudes of cheaper and often worthless books, have been sold in this way. For the higher class of books, however, the day of the agent is passed, and his work is mainly done by the press.

[1] Fowler's *Publicity*, p. 171.

[2] *The Advertising Man*, cited in *Printers' Ink*, July 26, 1899.

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The general advertising of periodicals is increasing, especially with the competition among the popular monthlies and weeklies. The *Ladies' Home Journal* and the *Saturday Evening Post* have probably been more extensively advertised than any periodicals in this country. The only paper to be compared with them in this respect is Robert Bonner's *Ledger*, forty years ago. The extent of his advertising was then without precedent; whole pages of daily newspapers were used by him to blazon forth the merits of the *Ledger*.[1] One such advertisement—probably the "Fanny Fern writes for the *Ledger* only"—cost him $60,000.[2]

Newspapers advertise themselves indirectly by connecting their names with some great undertaking, as the *Times* did in the exposure of the Tweed Ring in New York, and the *Herald* by sending Stanley to Africa to find Livingstone.

Certain makers of pens, ink, and paper are large advertisers, and have been so for many years. Fountain pens, perfected in recent years, appear in all general mediums, and the manufacturers of one of them, at least, must spend $50,000 a year in advertising it. But the advertising of the typewriter is the largest of all and ranks with that of the bicycle and the camera in its extent. It first appeared in *Harper's Magazine* in 1885, and reached its height in 1895, since which time it has somewhat fallen off. Since 1890 there have been from eight to fourteen different advertisements of this article in each number.

THE ORGANIZATION OF ADVERTISING.

We now pass to the active agents in advertising and their organization.

The advertiser is the central figure. There are all grades, from the hawker, who makes use of his own voice in crying directly to the public the wares which he carries in his pack,

[1] Philadelphia *Bulletin*, cited in *Printers' Ink*, August 16, 1899.
[2] *Bates' Advertiser's Guide Book*, September, 1884.

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up to the executive of a great corporation with factories in several countries and storehouses of goods dotting the globe, who calls to his aid a dozen different agencies directly or indirectly connected with the desired end. The latter is the modern type.

In October, 1898, there were 2583 general advertisers making use of American periodicals.[1] This number does not include the insignificant concerns that use two or three lines in the cheaper publications, but the larger and more reputable ones. Probably there are nearly or quite 3000 in 1900.

Their geographical distribution is shown by the following table: —

Maine	21	Virginia, West Virginia	10
New Hampshire	15	North Carolina, South Carolina	3
Vermont	12	Georgia	5
Massachusetts	364	Florida	6
Rhode Island	23	Alabama	0
Connecticut	88	Mississippi	0
New York	863	Louisiana	4
New Jersey	49	Texas	4
Pennsylvania	187	Arkansas	0
Delaware	3	Oklahoma	0
Maryland	12	Tennessee	6
District of Columbia	16	Kentucky	8
Ohio	189	Wyoming	0
Indiana	43	Idaho	0
Illinois	367	Montana	0
Michigan	104	Utah	0
Wisconsin	52	New Mexico	0
Minnesota	25	Arizona	0
Iowa	16	Nevada	0
Missouri	36	California	16
Kansas	4	Oregon	0
Nebraska	6	Washington	13
North Dakota, South Dakota	0	Canada	6
Colorado	7		

Sixteen hundred twenty-two, or 63 per cent, were in the New England states, New York, New Jersey, and Pennsylvania. New York alone had 863, or 33⅓ per cent. Two thousand three hundred seventy-seven, or 92 per cent of the

[1] *Press and Printer*, October 29, 1898.

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whole, were north of the Ohio and Mason and Dixon's line, and east of the Mississippi.

The twenty largest cities had the following numbers: —

New York	664	Philadelphia	130
Boston	243	San Francisco	8
Cleveland	24	New Orleans	3
Washington	16	Milwaukee	26
Minneapolis	13	Louisville	4
Chicago	308	St. Louis	26
Baltimore	10	Cincinnati	67
Buffalo	18	Pittsburg	16
Detroit	27	Newark	10
Jersey City	7	Omaha	3

New York, with 664, has 26 per cent of the whole; and together with Boston and Chicago has 1215, or over 48 per cent of the whole. Nothing could more strikingly show the concentration of business in the great centers.

Local advertisers are of course vastly more numerous than general advertisers. From the figures for a single city an estimate for the whole country can be made. From Bradstreet's and Dun's an estimate of the number of business firms can be formed, and from this some approximation to the number of advertisers obtained. One authority says that there are seventeen in every thousand of the population, or over a million in all; another says five hundred thousand, excluding the transient wants, and that two-thirds of them are constant. The latter seems to be within bounds; it would be an average of about twenty-three different advertisers in each of the 22,000 periodicals in the country. From the number of general advertisers already given it will be seen how vast a majority of all are local.

While the great majority of business men write their own advertisements the tendency is, as business grows in extent and complexity, to employ a skilled man to prepare them. During the last fifteen years this art has developed rapidly, furnishing a new calling for hundreds of men and women. The best of them are paid from $5000 to $25,000 a year.

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There are others who prepare advertisements to order. They will also plan a whole advertising campaign for those whose business is not large enough to employ one writer exclusively. Even here the principle of division of labor asserts itself, and some are found devoting themselves to one line of writing, as in the drug business, for example.

At least two schools of advertising have been established. One is in Chicago, conducted by two experienced writers, and its curriculum includes ninety-eight divisions of study grouped under the following headings: Essays; Illustrating and Engraving; General Advertising; Local Advertising; Making and Displaying; "Adwriting"; Mail Order Advertising; Outdoor Publicity; Printing and Lithography; and Special Sales and Openings.[1] The other school is in Indiana.[2] Both give instruction by mail as well as at the school. Besides these regular schools the columns of the metropolitan dailies occasionally contain an offer by an experienced advertisement writer to teach the art to individuals.

While these enterprises encounter a good deal of contempt and even opposition, it would seem that, conducted in a practical way, they ought to find a field of work. Systematized knowledge and experience, obtained under intelligent guidance, are acquired more rapidly and to better advantage every way than by individuals haphazard and alone, provided that the pupils are desirous of obtaining them.

In conclusion it may be said about the advertisement writer that it was the general agreement among the two hundred and fifty large advertisers represented in Fowler's *Publicity* that an expert was necessary for their success.

Closely related to the class of advertisement writers, and in fact merging into them, are the advertising agents, whose function it is to act as an intermediary between the advertiser and the newspaper or other medium. The earliest agent in America is said to have been Orlando Bourne, who

[1] H. B. Howard, in *Printers' Ink*, May 24, 1899.
[2] L. D. Sampson, in *Printers' Ink*, June 7, 1899.

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began business in New York in 1828. In 1841 Volney B. Palmer established himself in the same city,[1] and the next year John W. Hooper and Co.[2] Palmer soon branched out to Boston and Philadelphia. Other firms were established in course of time, and at the present day every large city has several. New York has always been the center, and in 1871 one-half the agents were in the *Times* building in that city and did nine-tenths of the annual business of the country.[3]

Among large concerns the tendency is to have an advertising manager who takes charge of that side of the business, planning the campaign, furnishing the main ideas to be worked out by his assistants, and placing the advertisements direct, without the intervention of outside agents. However, the agents still handle about three-fourths of all the general advertising done.[4] The tendency to specialization manifests itself among the agencies in that certain ones devote themselves to work with mediums of a particular class. There are two in New York whose special field is the trade journals. At the other end of the line are the so-called "special agents," representing one or more publications and soliciting business from the advertisers. Chicago and New York are the centers of this business, the former city having an organization, the Agate Club, whose object is to develop advertisers in the West.[5]

Of the periodical press, which is the main reliance of the great majority of advertisers, we have already spoken. For information concerning it, outside of its own locality, the advertiser depends upon the directories published by the agencies. The two oldest and most comprehensive are *The American Newspaper Directory*, established in 1869, and *Ayer's American Newspaper Annual*. They are bulky volumes of thirteen to fifteen hundred pages each, containing

[1] Palmer's "Rules and Hints for Advertising."
[2] Rowell's *Advertiser's Gazette*, January, 1871.
[3] *Ibid.*
[4] Fowler's *Publicity*, p. 352.
[5] *Advertising Experience*, August, 1898.

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lists of papers in the towns and cities of each state, arranged alphabetically, and giving the size, frequency of issue, rates, circulation, publisher's name, and other data. They also give lists of the different classes of papers, as of dailies, religious weeklies, and agricultural papers.

Thirty-five years ago no complete list was published. A few large advertisers had compiled their own, which they jealously guarded, and the agencies had them and treasured them as their most valuable possessions. The number of papers in the first directory in 1869 was 5000; those for 1899 contained over 21,000.

Engaged in the distribution of periodicals there are 3600 people in the United States who are exclusively newsdealers; and 10,000 who are "booksellers, newsdealers, and stationers" in the United States and Canada.[1] The agency of the American News Company in the cheap and expeditious distribution of periodicals is of the highest importance. Beginning in a small way in New York in 1864 it afterwards established branches in other cities. Meanwhile different companies had been formed in New York, Philadelphia, and Chicago, but they were eventually all combined with it to form the greater company.[2] The branches generally retain a local name, as the New England News Company of Boston and the Central of Philadelphia do, but they are simply parts of the one main company. The company distributes 2000 American newspapers and periodicals, more than 500 English, 100 French, 80 German, and a smaller number of other publications. Its yearly business is about $15,000,000.[3] It is an indispensable convenience to hundreds of publishers in that it buys their whole editions outside of what is mailed to regular direct subscribers; the edition is off their hands and paid for the moment it leaves their doors. It effects an immense saving by putting into one package all the different

[1] Trow's Addressing Co., cited in *Printers' Ink*, July 5, 1899.
[2] *Art in Advertising*, cited in *Printers' Ink*, March 15, 1899.
[3] *Mail Orders*, cited in *Printers' Ink*, July 26, 1899.

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publications destined for one dealer in a village or city and systematizing the whole work. Needless to say, it wields almost despotic power over the destinies of the publishing houses, especially the newer and weaker ones, since it is practically impossible for a periodical to be distributed without its assistance.

Newspapers and periodicals for the railroad trade are distributed by the Union News Company, which is the railroad branch of the main company.

If the advertiser sends out circulars, catalogues, etc., a list of addresses is necessary. These he obtains from the "letter brokers" and owners of address lists at so much per thousand. He can obtain lists of any class of people, of any occupation or degree of wealth, in any city, locality, or state. If he so desires, the addressing companies will furnish addressed envelopes or wrappers, fold and enclose the circular, and print the "return card" on the envelope, relieving him of all care in the matter. The address lists are obtained from letters written to publishers and advertisers, from local and trade directories, the commercial agency books, and the newspapers,—the latter through the "press clipping bureaus."

The clipping bureaus make a business of reading all sorts of publications for all sorts of purposes. Originally they worked for musicians and other public performers who wished to collect press comments and notices of themselves, but now the scope of their work is unlimited. They chronicle births, marriages, deaths, casualities, and sicknesses from the daily and weekly papers for the benefit of makers of infants' foods, dealers in duplicate wedding presents, monument makers, artificial leg makers, etc. Projects for bridge and factory building and for all kinds of construction are noted for the use of builders and dealers in building material. Today there are bureaus in all the large cities of the country. One has branches in several cities, and still another, which claims to

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be the original one, has offices in the European capitals, Sydney, the city of Mexico, and New York. To illustrate the magnitude of the business it may be stated that a Chicago bureau prints a list of over 3500 dailies and weeklies and 110 magazines which it reads and clips. Another claims to clip 15,000 copies of papers every week and send out 10,000 items daily. A third clips 10,000 copies a week and employs fifty people. The labor is minutely sub-divided, one set of workers reading and marking, and others clipping, pasting, sorting, etc. There are about twenty bureaus in the country, with a total of about three hundred employees.

The advertiser may desire a house-to-house distribution of his printed matter or samples. If so he employs the professional distributor, whose business, fast becoming highly organized, has been sufficiently described already. The tendency towards consolidation is also marked among the bill-posters and street car advertising agents, but among the other coadjutors of the advertiser it does not appear. "Demonstrators" are too new as yet, and possibly their sex is a reason for the delay to organize. Window trimmers and commercial travelers are organized, the latter having been so for a long time.

Like every other group of people having a common interest those concerned in advertising have their journals, including newspapers covering the whole field and organs of special branches of the business. The oldest and largest in circulation is *Printers' Ink*, established in New York in 1888. It is a small, double column, 48 to 90-page weekly, containing interviews with practical advertisers, articles on various aspects of advertising, letters, news notes, editorials, a "department of criticism," and from ten to forty pages of newspaper and agency advertising. Being the oldest paper of the kind and very ably conducted, it maintains the leadership. It has a circulation of about 20,000 copies. It is said to have had over two hundred imitators, most of them short-

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lived, and published by large advertisers, by "adwriters," or as adjuncts of advertising agencies. Some of them, however, are journals of real merit and of a high tone in their editorial discussions. Two or three are published in England, one in Bombay, and one in Melbourne. As far as ascertained there are none in France or Germany. Following is a list of forty-two, collected by the writer, all of which were in existence at last accounts: —

The Ad Book, San Francisco, Cal.
Adology, Detroit, Mich.
Ads, Louisville, Ky.
Ad Sense, Chicago, Ill.
The Advertiser, Cleveland, Ohio.
The Advertisers' Guide, New Market, N. J.
Advertising Experience, Chicago, Ill.
Advertising for Druggists, North Adams, Mass.
The Advertising Man, New York.
Advertising Success, New York.
The Advertising World, Columbus, Ohio.
The Advisor, New York.
The Ad-Writer, St. Louis, Mo.
Agricultural Advertising, Chicago, Ill.
The Billboard, Cincinnati, Ohio.
The Billposter-Display Advertising, New York.
Boyce's Hustler, Chicago, Ill.
Brains, New York.
Class Advertising, New York.
Charles Austin Bates' Criticisms, New York.
Fame, New York.
General Information, Binghamton, N. Y.
Harman's Journal of Window Dressing, Chicago, Ill.
Ideas, New Haven, Conn.
The Imp, Lincoln, Neb.
Indentors' Guide, Bombay, India.
The Mail Order Journal, Chicago, Ill.
Mail Orders, New York.
The Middleman, Chicago, Ill.
The National Advertiser, New York.
Our Silent Partner, Waterville, Maine.
Plain Talk, Chicago, Ill.
Press and Printer, Boston, Mass.
Printers' Ink, New York.
Printers' Ink Supplement, London.
Profitable Advertising, Boston, Mass.
Publicity, Hull, England.
The Reporter, Chicago, Ill.
The Rhode Island Advertiser, Providence, R. I.
The Show Window, Chicago, Ill.
Up-to-Date Distributor, Cleveland, Ohio.
The Western Advertiser, Omaha, Neb.

Besides these strictly trade journals, a considerable number of papers, especially commercial papers, conduct departments devoted to the subject, and occasionally a daily paper prints a series of articles written by an expert for the benefit of its advertisers.

The great extent to which the principle of the division of labor has been carried is one of the marked features of the advertising of the present day. The whole process has been minutely subdivided, so that each part of it, from the planning of the campaign to the placing of the advertisement in the hands of or before the eyes of the public, is performed

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by a specialist. Following the development of these special organs we look to see them combined so that they will work together most economically. This stage has already been entered upon. It is a part of the general movement towards organization which is taking place in the social and political as well as in the economic world.

Large advertisers are combined in special and general associations. An example of the former is the "Proprietary Association of America," an organization of the patent and proprietary medicine makers. It has been in existence seventeen years, and has five hundred and fifty members. The "Sphinx Club" of New York is an organization of men in the advertising business or any of its allied interests,— agents or advertisers. Its purpose is general discussion of the problems of practical advertising. The "Association of American Advertisers" is a general organization, formed in New York in December, 1899. It consists of one representative and his alternate from any reputable house.

ADVERTISING IN FOREIGN COUNTRIES.

The character of Canadian advertising is influenced by the presence of the French element, and by English traditions and usages; but, on the whole, it is very much like that of the United States. The classes of goods advertised, the variety of mediums used and the relative importance of each, and the general style of the advertisements — language, display, illustration — are much the same as on this side of the line and tend to become still more so.

England was the pioneer in modern advertising. Some phases, as that of outdoor advertising, she passed through thirty years ahead of us; in others, such as newspaper display and illustration, she is far behind. In the amount of advertising *per capita* she ranks very nearly if not quite up with the United States. Outdoor signs, posters, etc., are used to an extent not yet reached here, and it is to be hoped

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never will be reached. Cities, railway stations, and waysides are plastered with signs. Magazine advertising is a small affair compared with ours. Much of it is done by means of "insets"— loose sheets or folders placed between the leaves. Many of the British weeklies have huge circulations, and are well patronized by the advertisers. The dailies carry an immense amount of matter, but have not until recently admitted display type or cuts. Much less art is used in the presentation of the advertisement than with us. The bright, incisive, clean-cut style of our commercial paragraphers is wanting. Instead the Englishman says "use so and so," "wear so and so," "eat so and so," "they are the best"; and that exhausts his descriptive and persuasive powers.

French newspapers contain fewer advertisements than those of Germany, England, or the United States. The papers are very poorly printed on cheap paper and charge high rates. The *Petit Journal*, with a circulation of over a million a day, is the most famous; its rates are from four to six dollars a line. Cuts and display type are very poor. There are two important advertising agencies in Paris, one of which has exclusive contracts with a large number of newspapers and works in their interest, rather than in that of the advertiser.[1] The interiors of the omnibusses are used for placards much as our street cars are, and the interior walls of the omnibus stations are covered with posters. Advertising cabs, the sides of which are covered with posters, carry passengers in Paris for half fare. The railway stations are utilized for advertising, both inside and out, and along the lines leading from the cities are many billboards, as in England and America. France is the home of the poster. Billboards are numerous along the streets and boulevards, covered with striking posters done in brilliant colors, many of them of very high artistic merit.

According to all testimony advertising in Germany is much behind that in the United States.[2] Less energy and expense

[1] T. B. Russell, in *Printers' Ink*, December 14, 1898.

[2] *Consular Reports*, June, 1898, p. 251. Also, Fowler's *Publicity*, p. 136.

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are put into it, and there are not so many large firms covering the whole country; more than that, the buying public is much smaller and has less money to spend. A German firm which advertises in both countries says that the so-called "great" style of Americans would not succeed in Germany.[1] In Leipsic, a typical city, the retail stores depend largely upon window display, many of the windows extending down to the basement floor for this purpose. Uniformity of price is noticeable, even after Christmas. There is no attempt at "wonderful bargains" or "cut prices." The principal street advertising is by small posters on large circular columns twelve feet high and four feet in diameter placed at intervals through the city in conspicuous positions. Newspaper advertising is the most important. It occupies about half the space in the dailies. In a paper taken at random thirty-six out of sixty-four columns were filled with advertisements. The matter is very compact. The street cars contain but few placards and they are on the ceiling. In the theatres permanent signs are placed above the stage setting. Opera and theatre programs are posted on the cylinders in type not much larger than ordinary newspaper type.[2] Exaggerated or untruthful advertisements are liable to punishment by law in Germany, and judges are not slow in applying the law. Sales because of "stock-taking," "removal," and "retiring from business," must be genuine or they lead to a fine.[3]

Advertising in the British colonies is much like that of England itself in character, but is scanty in its amount. The newspapers are poor in appearance and exclude cuts and display type even more strictly than the English papers do. A correspondent states that advertising in South Africa is small in quantity and poor in quality. The railway stations are used for enamel plates, painted boards, and occasional posters. There are no field signboards because few people

[1] Fowler's *Publicity*, p. 163.
[2] *Consular Reports*, June, 1898, p. 251.
[3] *Ibid.*

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travel. Billposting is done in the large towns. In the country there is very little advertising, even in the newspapers. Our correspondent states that those who wish to introduce a new article among the Dutch farmers bribe the "predicant," and the thing is mentioned in next Sunday's sermon!

Japan is taking on the usages of civilization in this respect as it is in every other. In eighteen years 575 daily and weekly newspapers have been established, besides many class papers.[1]

ADVERTISING EXPENDITURE.

In describing the mediums and subjects of advertising we have given figures in many instances. We will now group together some of these for comparison, adding new ones also. The total advertising expenditure of the business countries of the world is estimated by Fowler to be over $2,000,000,000 annually.[2] He does not explain how he arrives at this estimate, but presumably it is by taking the United States as a basis, and reckoning the probable relative amount in other countries. Estimates for the United States vary from $200,000,000[3] to $500,000,000.[4] The difference is partly accounted for by the lapse of time between the smaller and the larger estimate. Five years, and especially that five years, shows a vast increase in the amount of advertising in this country. But, as will be seen later, even this estimate does not take all the mediums into account.

For newspapers and periodicals Harris's estimate in 1893 was $100,000,000. In 1897 Herzberg figured it at $200,000,000;[5] and in August, 1899, *Printers' Ink* made it between $200,000,000 and $300,000,000.

In billposting and other outdoor advertising Mr. R. J. Gunning places the expenditure for 1898 at $50,000,000, of

[1] *Printers' Ink*, May 10, 1899.
[2] *Publicity*, p. 552.
[3] E. P. Harris, *Social Economist*, March, 1893.
[4] *Art in Advertising*, September, 1898.
[5] *Lippincott's Magazine*, July, 1897.

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which half a million was in Chicago.[1] In England the annual wages of billposter employees are reported by *Publicity*,[2] an advertising journal published at Hull, as amounting to $7,500,000. Wages constitute perhaps one-half the total cost.

There are 750,000 store fronts in the United States fitted with plate glass windows to allow of the display of goods.[3] One hundred dollars a year would seem to be a fair average of the cost per window, counting interest on the first cost, rental value of the floor space taken, loss on goods used for display, apparatus used, and value of time spent by proprietor, clerks, or professional window trimmer. This would give a total of $75,000,000 a year for windows alone, to say nothing of display arrangements within the store.

Mr. George Kissam estimates the annual expenditure for street car advertising at $2,000,000, and this is concurred in by other authorities.[4] For occasional literature and miscellaneous mediums no authoritative estimates or data are in our possession.

Under the head of personal mediums the cost of commercial travelers is the main item. The president of the commercial travelers' national league says that there are, or were until recently, 350,000 of the craft in the United States.[5] Taking the average annual cost or a commercial traveler as $2000 this gives a total of $700,000,000. As the traveler performs two functions — advertising and selling — one-half of this immense sum may be charged to each. Evidently it does not enter into the computations of total expenditure given above. Were it included it would increase the largest figures by three-fourths.

But it is relative and not absolute amounts which are most instructive and most important. What ratio does advertis-

[1] *Printers' Ink*, July 19, 1899.
[2] *Publicity*, August–September, 1899.
[3] *Brains*, October 21, 1899.
[4] *Printers' Ink*, August 24, 1898.
[5] Before the Industrial Commission, June 16, 1899.

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ing expenditure bear to the value of goods sold? To this question there is no reliable answer. But, taking the value of goods sold in the United States in 1890 at $10,000,000,000, and the total expenditure for advertising them at $500,000,000, we get a rate of five per cent. This is not an overestimate.

We will now give a number of individual cases where the ratio is known. A western flour miller spent about $18,000 in advertising a total output of goods which sold for $2,700,000, making a rate of two-thirds of one per cent.[1] A Chicago mail order house spends half a million a year in advertising and sells $15,000,000 worth of goods,— a rate of three and one-third per cent.[2] The case of the Monarch bicycle has already been cited. Its expenditure was from four to five per cent of its sales. The *Dry Goods Economist*[3] says that "two and a half per cent is regarded by many merchants as the ideal advertising appropriation, while others who base their success upon most extensive advertising do not consider five per cent too much." Mr. Charles F. Jones, who has every facility for making a fair estimate, thinks that the advertising of the twenty large New York department stores averages about four per cent. Their sales are about $50,000,000 a year, and their advertising expenditure about $2,000,000.[4] A western flour and feed mill firm figures that each inquiry in response to their advertisement costs eighty-seven cents,[5] and there is only one sale out of twenty inquiries, on the average. This makes the advertising on each mill cost $17.40, and as the mill sells for from one hundred to two hundred dollars the rate varies from eight and a half to seventeen per cent. A certain cereal food sells for ten cents a package, or $3.60 for a case of thirty-six packages. About one dollar of this is due to the cost of advertising it,

[1] *Printers' Ink*, January 4, 1899.
[2] *Ibid.*, December 14, 1898.
[3] Cited in *Printers' Ink*, May 10, 1899.
[4] *Ibid.*, January 25, 1899.
[5] *Ibid.*, June 14, 1899.

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or twenty-eight per cent.[1] A well-known proprietary article was advertised to the extent of $429,000 in 1893, and its sale amounted about $1,500,000, giving a rate of over twenty-eight per cent.[2] Another medicine firm spent $250,000 in 1898 to sell $1,500,000 worth of medicine, or over sixteen per cent.[3] One firm spends five per cent on some articles and twenty-five on others. Another medicine firm says that on some articles from thirty to forty per cent of gross sales is expended.[4] Cahill's "Advertising"[5] says that in many businesses it has paid to spend in advertising two-thirds of the capital invested; and A. T. Stewart said that he who had invested one dollar in a business should invest a dollar in advertising that business.[6]

That some firms can afford to spend almost any percentage necessary will appear from the following facts: In 1895 the Michigan food commissioner showed that one article which sold for fifteen cents cost one-third of a cent to make.[7] A certain household article which retails for ten cents costs the dealer less than two cents.[8] Some proprietary medicines very extensively advertised and used sell for seventy-five cents and one dollar and cost from four to six cents to manufacture.[9]

We cannot show statistically what percentage advertising forms of the value of the goods when they reach the hands of the consumer. The estimate of five per cent given above is thrown out only as an estimate. It was made quite independently of the figures given for individual advertisers. Four per cent seems to be a common rate among retailers,

[1] Charles L. Coleman, *Printers' Ink*, September 25, 1898.
[2] W. J. Lampton, in *Fame*, cited by *Printers' Ink*, November 29, 1899.
[3] John C. Graham, in *Printers' Ink*, February 15, 1898.
[4] Fowler, p. 126.
[5] Page 8.
[6] *Ibid.*
[7] *Vermontville* (Mich.) *Echo*, February 26, 1896.
[8] *Printers' Ink*, March 15, 1899.
[9] *Bulletin of Pharmacy*, quoted in *Advertising for Druggists*, June, 1899.

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but it must be remembered that many of their goods have been advertised one or more times before, and that the advertising done by commercial travelers all comes before the retailer gets the goods. As for the general advertisers, they spend varying percentages, all the way up to one-half their gross income, and occasionally even more.

The question now arises, "What part of this expenditure is an economic waste?" A considerable portion of it, surely. In the first place, much of that advertising which merely results in drawing trade to one seller at the expense of others must be put down as sheer waste. A case in point is the enormous advertising of coffee by the Arbuckles and the Woolson Spice Company in their rivalry. If the consumption of coffee is somewhat stimulated thereby, it is at the expense of tea or some other beverage. Coffee is already universally known and used; the public does not need educating on the subject. Another case is that of soap. In the summer of 1899, when the attempt was being made to form a soap trust, the promoters stated that $30,000,000 was annually thrown away in advertising soap. This was probably an exaggeration, but we have the statement of a conservative manufacturer that he would not consider a half of that sum too large an estimate of the waste.

The advertising springing from the rivalry of two or more retail stores in the same locality is another example. For the information of the public one advertisement would be as good as three or four. The rest are simply wasted. The labor of the great army of commercial travelers is in large part without economic value to society. A fraction of their present numbers would do the work they all now do, both in making known the existence and qualities of goods and in effecting sales. In this one point alone there is probably a waste of at least a hundred million dollars annually. Again, there is the advertising of many patent medicines, which

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operates chiefly to make people fancy that they need medicine. It simply plays upon the ignorance and credulity of the public. Were it to drop off altogether the economic condition of society would be improved by just the amount now spent upon it. Moreover, a considerable portion of what may, under existing conditions, be called legitimate and necessary advertising fails to reach the mark. A large general advertiser said that he made one mistake in advertising in 1898–99 which cost him $50,000.[1] Assuming for the moment that the use of his goods would have resulted in a gain to society, some $50,000 spent by him had failed to induce people to buy those goods. It was lost to him and to society. None but those in the business realize how much is annually wasted in this way. One large advertiser says that is seventy-five per cent of the whole expenditure; another authority says it is ninety per cent.[2]

Further illustrations might be given but are perhaps unnecessary. Let it be understood that advertising has a legitimate function, namely, to make known the qualities of goods and the conditions upon which they may be had, as a preliminary and necessary condition of their being distributed among the people. But when it is used to introduce or increase the sale of an injurious or worthless article; when it influences the public to an undue expenditure upon a good article; when its volume goes beyond what is necessary to inform the public; and when it serves merely to divert existing demand into particular private channels — in all these cases, and they constitute a large part of the total, advertising is an economic waste. Can this waste be prevented? Some light is thrown upon the question by the great industrial combinations.

The two combinations which have longest been prominent — the Standard Oil Company and the American Sugar

[1] *Profitable Advertising*, December, 1899, p. 477.
[2] Fowler, p. 196.

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Refining Company — have done practically no advertising. The latter has, however, recently taken it up as a result of the competition of independent refineries, and the former for the purpose of pushing certain of its by-products. Many of those lately formed have cut very deeply into one form of advertising — that of commercial travelers. The president of their national league testified before the Industrial Commission on June 16, 1899, that the trusts had up to that time discharged 35,000 men, and reduced the salaries of 25,000 more, entailing upon them a loss of $60,000,000 a year, which was saved to to the trusts, as was also $21,000,000 railroad fare and $27,000,000 in hotel bills. He stated that there had been discharged by the tobacco combines 3000 men; by the bicycle combine 600 men; chair, 500; rubber, 300; sugar and coffee, 1000; steel rod, 300; baking powder, all but six; tin plate, nine out of every ten. Whether these figures prove to be accurate or not, economy in this form of advertising is one of the main motives and first steps of the combinations. The saving is an immense one.

Are the trusts able to make similar savings in other forms of advertising? The best opinion seems to be that, while a considerable saving can be made, it will not be as large as in the case of commercial travelers. In the first place their monopoly is not absolute. In many cases independent producers still compete with them, and in order to keep their share of the trade they must continue advertising. In other cases competition, although not actual, is at hand as a possibility whenever an opening presents itself. The trust must cover the field continuously in order to prevent such an opening. Moreover, even if the trust had a complete and safe monopoly it would generally be to its advantage to continue, and often to increase its advertising expenditure.

The truth is that human wants are elastic. They quickly expand under the right conditions and contract when pres-

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sure is exerted upon them. In this fact lie our hope of progress and our safety in times of depression. None are so keenly alive to the fact as the general advertisers. Many are the instances in which the demand for new goods or for a particular brand of old goods has been built up from nothing by continuous advertising. The advertiser cultivates wants.

It is safe to say that in the case of most goods now generally advertised, and of most houses which advertise either locally or generally, the sales would fall off to a ruinous extent were the advertising withdrawn. Now while it is true that some trusts have withdrawn a part of their advertising, those businesses which have been built up on it must continue. The baking powder trust, for example, cannot discontinue the advertising of the "Royal" or "Cleveland" brands. Were they to do so the independent companies would seize the opportunity to push forward their products. Furthermore, the trust being capitalized on the combined capital of all the companies forming it, at the least, and this value depending in each case on the advertising which had built it up, it is evident that that advertising must continue if the revenue from the sale of the several brands is to continue. Of course it may be a part of the purpose of the trust to drop the brands of the smaller component companies and substitute the two or three better known ones for them. In this case they can be only partly successful, for the independent companies are at hand again.

The only mediums besides the commercial travelers to feel severely the effects of the withdrawal of advertising by the trusts have been the trade papers. The Chicago *Tribune* is authority for the statement that the failure of three or four of them is directly traceable to the formation of trusts in their industries, and the consequent cessation of advertising by the smaller concerns swallowed up.

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The department stores throw some light on this question, for they are similar in their nature to trusts. They find it necessary to advertise against actual and possible competition, and they find it profitable also. Their advertising stimulates buying. It draws crowds in every city. It is the most striking feature of the daily papers, and its volume is undoubtedly much greater than that of the hundreds of little stores would have been, had they remained independent. On the whole, therefore, it does not seem probable that advertising will be much if at all reduced as a result of the trust movement.

Fuller treatment of the economic side of our subject and the discussion of its psychology, its esthetic and its ethical aspects, are not permitted by the limits of this article, and are reserved for other papers.

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THE PRACTICAL USE OF VITAL STATISTICS.[1]

By Frederick L. Hoffman.

Vital statistics, in the words of Dr. Newsholme, "is the science of numbers applied to the life history of communities and nations," and this definition being accepted, we are on the outset confronted by a matter of general importance, since there are none of the people of this State so high or so low but that to them life has its value in direct proportion to its duration. Time was when mankind believed that those "whom the gods love die young," but this doctrine of fatalism no longer prevails in the light of modern medicine and sanitary science, for both of these efforts for social betterment and the amelioration of the conditions under which the people have to live could not exist but for the modern science of vital statistics, than which there is no field of research more promising of useful and practical results.

It has been necessary for me to confine myself in this discussion to mortality statistics, since even a superficial consideration of the other branches of the science, dealing with the statistics of marriages, divorces, and births, would consume more time than I have at my command. But, manifestly, the mortality statistics must needs be looked upon as the most important branch of the science, since they affect more directly the interests and the welfare of the living people of this State. Although I readily recognize the great social value of the statistics of marriages, divorces, and births, I personally have had but little opportunity to investigate these subjects.

My discussion as to the data of human mortality will be largely confined to the conditions as they exist in the State of New Jersey, and as they are made plain to us by the facts already in our possession through the efforts of the State Board of Health since 1878. Data of some historic value have been collected for previous years, but as regards the State as a whole, we have no information of scientific value for years previous to 1878. For some of the counties, especially for Essex, we have information of value for years as far back as 1859, in a report on the "Health and Morality of Newark, N. J.,"

[1] Read before the New Jersey Sanitary Association.

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by Dr. Edgar Holden, for the period 1859–1878. Another valuable paper on the "Climatology and Diseases of Essex County" is to be found in the *Transactions of the Medical Society of New Jersey* for the year 1887, in which also the vital statistics for years previous to 1878 are incorporated in considerable detail. Since 1878 and to June 30, 1899, there have been recorded in this State 550,955 deaths, and of these records and their practical value it is my intention to speak to you this evening.

The essential facts known to us as to this large number of deaths are: (1) The year of occurrence; (2) the ages of those dying, by certain specified groups of years; (3) the sex; (4) the causes, arranged according to reasonably well defined groups of diseases; (5) the locality, with a reasonable degree of precision. More details would, of course, be desirable, more accuracy would be of great value, but on the whole, as the information has been made public, it is of practical value to the State, to the medical profession, and to the public at large. The information available is sufficient to approximately indicate the rise or fall of the general death rate and the corresponding increase or decrease in the longevity of the people of this State. The information is not as useful as it could easily have been made had those in charge of the registration and publication of these statistics been more liberally supported by the State in their arduous efforts; but even in their present condition they are a valuable means of indicating to us the steady progress which has been made in this State during the past twenty years. It is but proper that mention should be made of one to whom we are largely indebted for the good work which has been done during a large part of this period, namely, Dr. Ezra Hunt, formerly the Secretary of the State Board of Health.

Our information as to the mortality in this State is supplemented by the census reports made for the past fifty years on the mortality of the United States, but in particular by the life tables of New Jersey, which have been incorporated in the census reports of 1880 and of 1890.

A careful study of this available body of information, really the vital history of the people of this State, is indeed not only a most interesting subject, but one of great promise of practical results. The first fact which is impressed upon us by a study of the life tables

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of the two census years mentioned would indicate that the sanitary progress, of which we hear so much, has not affected as large a proportion of our population as is commonly supposed to have been the case. Unquestionably, immense progress has been made and almost wonderful results have been accomplished in the direction of diminishing the mortality of children under the age of fifteen years. As an illustration I may mention the fact that if we take the three years, 1879–1881, and compare them with the last three years, 1897–1899, we have only 24,208 deaths under twenty years of age in the latter period against 28,880 deaths under twenty years during the earlier period of our history, although during the same years the population has almost doubled itself. But this gain in longevity at earlier ages has not been made at the ages past middle life, and we have a pertinent illustration in support of this theory in the two life tables for New Jersey, published in 1880 and 1890, showing that while in 1880 the expectancy of life at the age of twenty-five was thirty-nine and eight-tenths years; in 1890 it was only thirty-seven and four-tenths years; that while in 1880 at the age of fifty the expectancy was twenty-two and three-tenths years; in 1890 the expectancy was only twenty-one years. In other words, the mortality at older ages is today higher than it was twenty, or even ten, years ago. I cannot burden this paper with statistics on the subject, but I hope to add a series of tables in an appendix to this paper when the same is finally published in the *Transactions* of the Association.

At present it is impossible to point out definitely and precisely the causes responsible for the unquestionable increase in the mortality at ages above twenty. We have not for this State the detailed information as to the causes of death which would be necessary for a thorough and complete study of the subject. I understand that these imperfections will be largely done away with in the future reports under the new law, according to which the Bertillon system of classification will be adopted, and I sincerely trust that together with this improvement in disease classification there will come a corresponding improvement in the collection of more detailed information as to the ages at death. To make our vital statistics of more practical value, the ages at death, together with the corresponding causes, must be given for single years under the age of five and for five-year periods over the age of five. It is only in this manner that we

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can arrive at a definite conclusion as to the age incidence of disease and the causes which are responsible for the present excessive mortality at ages over twenty. But what is most needed in addition to a more complete registration of causes and ages is detailed information as to the occupations at death. At present we have absolutely no knowledge as to the relation of disease occurrence in different occupations, and it is in this direction that the greatest practical value of vital statistics finds its logical explanation.

As the result of frequent and comprehensive investigations, I am satisfied that there is no subject deserving of more thorough investigation and study on the part of our physicians and those in charge of the sanitary interests of our different towns and cities than the intimate relation which unquestionably exists between occupation and mortality. There are in this State trade centres where industries of a special order are carried on on a very large scale, and as such we may mention the pottery and rubber industries in Trenton, the glass industry in southern New Jersey, the hat industry in Orange and Newark, and the silk industry in Paterson; yet, as far as our information goes, we know nothing of determining value as to whether these industries are responsible for the increased mortality at ages over twenty of which I have spoken. It is true, and we may speak of this with pride, that special investigations have been made by disinterested students of the subject, and that reports of great value have been published in the annuals of the State Board of Health and of the State Bureau of Labor Statistics. No reports of any other State boards of health contain such precise and satisfactory information as to the diseases of workingmen employed in the principal industries of the Commonwealth. Commencing with 1878, we have in the reports of the State Board of Health a series of valuable papers on the diseases of hatters, of potters, of glass workers, of rubber workers, etc. Commencing with 1889, and terminating with 1895, we have in the annual reports of the State Bureau of Labor Statistics exceedingly valuable and suggestive inquiries into the trade life of workingmen, not only in the principal manufacturing industries, but also in other dangerous and unhealthy occupations. Very little in this direction has, however, been done for the past ten years, and it is my plea to you at this meeting that our special efforts in this direction should not be relaxed, or that we should be satisfied with

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what has been done in the past, but that we should enlarge our scope of inquiry, supplement our limited body of observed facts with a large body of statistics collected by the State Board of Health as to the diseases of workingmen employed in the useful and productive trades and industries of this State.

Valuable as the investigations of the State Board of Health and of the State Bureau of Labor are to those who are most interested in the subject, they fall short in that they have not the support of a large series of observed facts to be found in the death certificates of those whose lives have terminated in this State during the past twenty years. I would urgently recommend that for practical use in our vital statistics we should have in the future a detailed and comprehensive table, showing for all of the principal occupations or industries the causes of death according to age periods. That this task is not impossible, or even very difficult, is illustrated in the excellent reports of the health officers of Sheffield and Blackburn, England. These reports can well serve as a model for our own State Board, should it appear to be possible and feasible to undertake the construction of occupation mortality tables. I am fully aware of the inherent difficulties which accompany such inquiries; I fully realize the difficulty of obtaining exact information as to the occupation at death, but it is not for us to be discouraged by such difficulties, but for us who are really and vitally interested in the collection and publication of such statistics to solve the difficulty, and that this difficulty can be solved all of us know who are familiar with the excellent and useful reports published under the direction of the Registrar-General of England every ten years. In certain directions an improvement of our present statistics is easily possible. There should first be added to the death certificate a second question as to occupation, stating the industry or trade in which decedent was engaged at the time of his or her death. To explain to you the meaning of this point, I will say that at present a death certificate may contain a statement of the occupation of decedent at the time of his death as that of a moulder, but unless it is stated that he was a moulder in a pottery, he would be classified among iron moulders or stove moulders, as the case might be. Similar cases could be mentioned, as, for instance, engineers, where we have no information as to whether decedent was a stationary engineer, employed on a railway, or possi-

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bly a civil engineer; but if the second line is added referring to our first illustration, it would have been stated that the decedent was a moulder in pottery, and his death in that case would have been accurately classified. I would, therefore, suggest that the State Board should adopt a new death certificate, in which the first line referring to the occupation would merely ask the question as to "occupation at death"; the second line would ask the question, "industry or trade at death"; and by an answer to these two questions we would obtain the accurate and necessary information demanded for the best interests of the working people of this State. A third question could be added which would materially increase the value of these statistics, which, however, is not of quite so much importance as the second question which I would like to have added to our present certificate. It would be desirable to have a definite statement as to whether decedent at the time of his death was an employer or an employee. Manifestly, it is a very different matter whether decedent was the owner of a pottery or a working potter at the bench. If we could obtain this information we would very materially enhance the practical value of the vital statistics of this State.

But a further decided and material improvement in this direction is possible through a co-operation between the Bureau of Labor Statistics and the Bureau of Factory Inspection. The reports of the latter are at present of practically no value for the study or solution of questions pertaining to the trade life and disease or accident liability of men employed in the unhealthy or dangerous industries of this State. I can conceive of no practical reason why so large an amount of routine information should be published which can serve no useful purpose except (and the reports are practically limited to this information) that of record, and why the energy and effort expended in this direction should not serve the more useful purpose of placing before the people of this State information of value as to the real sanitary condition of factories and the health factors affecting our working people in the same manner as this has been done for so many years in the reports of the Board of Factory Inspectors of Great Britain. Many of the reports of the factory inspectors of different States are in this respect of far greater value than the reports published by our own Board of Factory Inspectors, and I believe that if the subject were thoroughly investigated by a commit-

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tee of the legislature, or by disinterested citizens of this State, there would be inaugurated an improvement which would make it possible for those who are interested in the subject to realize fully the present state of factory life in this Commonwealth. It would be possible on the basis of the statistics and supplementary information collected by the co-operation of the State Board of Health, the State Bureau of Labor Statistics, and of the State Board of Factory Inspectors, to produce a body of indisputable facts, on the basis of which it would be possible to frame more scientific rules and regulations by which our working people engaged in the most useful pursuits of life could be better protected than they are at the present time, and as they fully deserve to be.

These statistics of mortality by occupations, and the supplementary information as to the sanitary state of our factories, would have a secondary practical value to a large number of physicians, who in the light of published facts and on the ground of their own experience, verified and supplemented by such facts, would realize the almost boundless and at the present neglected opportunity for the study of diseases of working people employed in dangerous and unhealthy occupations for the purpose of developing special ability, which in time will give us a class of medical specialists of the diseases of workingmen, as we now have such specialists for diseases of the eye or ear, and for other parts of the body. Certainly no class of specialists is more urgently needed and none are likely to make more rapid progress in their own material welfare. The increase in general intelligence among our working people today, justly considered the most advanced industrial workers in the world, will soon create a distinct demand for more satisfactory and reliable advance on matters pertaining to illness and casualities directly the result of the industries in which our people are engaged. The advice of such specialists will be respected, and men will act thereon, and if necessary change their occupation, or change to another branch of their occupation less dangerous or injurious than the one in which they may be engaged, and in which they may have developed diseases in their incipient stages, not sufficiently advanced to be beyond improvement or complete recovery. Much has already been done in this direction by a few devoted and intelligent physicians, but most of all by such men as Dr. Arlidge, the English authority on diseases of men employed in

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the potteries. There will come a time when we will coin a new term in medicine and speak of industrial medicine, just as we today speak of industrial chemistry, and both sciences or arts will indeed be most closely allied to each other.

I have limited myself to this one illustration of the value and utility of vital statistics, for unless we have more accurate information and a larger body of collected data as to the diseases of our working people, supported by accurate and extensive statistics as to the deaths in different occupations and the ages at which the deaths occurred, the development of industrial medicine will not be possible. What is true of the necessity of such statistics for the purpose of industrial medicine, is equally true of all other branches of medical inquiry into the longevity of our people as affected by other determining factors, such as surface geology, proximity to forest areas, of seashore and mountain climates, and many other factors which unquestionably have a direct influence upon the health of the people of this State. To enhance the practical value of the collected vital statistics would require in every locality a sincere and genuine interest in the local phenomena and the factors making for a long or a short life.

We, unfortunately, have developed, first, but little of this local spirit of inquiry, and, second, but little public appreciation and demand for published data as to the local health conditions. In curious contrast to the excellent work which has been done by the State Board of Health for so many years in publishing practical and useful information for the State as a whole, the local boards of health in New Jersey have published practically nothing of value, with the notable and recent exceptions of the cities of Asbury Park and Montclair. Some advance has also been made in the city of Newark, but none in proportion to the immense interests which are involved. For our other large cities, especially for Trenton, Camden, Jersey City, Paterson, and Orange, we have no health reports in such detail as are required for the best interests of the people of these cities. There is absolutely no reason why the cities of this State should not follow the example of other large cities in this country and publish annually a separate health report containing detailed information very much along the line as this has been done in so excellent a manner by the health officer of the city of Montclair, today perhaps the healthiest suburban city within fifty miles of the

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city of New York. In few States in this Union is it possible to supplement such local reports by all the necessary information as to geology, climate, water supplies, and industrial statistics as is possible in New Jersey. No other State in the Union has so thoroughly equipped a geological survey in the hands of men who have given primary consideration to matters of immediate and practical importance, while at the same time not neglecting matters of remote importance. Our State Weather Service has published reports of a very high degree of usefulness, and as regards the State Bureau of Statistics, it has also contributed its share of information of value to the health officer in supplementing his conclusions as to the local conditions making for a long or short duration of life. It is much to be regretted that the reports of the State Bureau of Factory Inspection cannot be included in this praise of our State departments of supervision and investigation of subjects directly or indirectly affecting public welfare.

I cannot refrain on this occasion from calling your attention to a matter directly connected with the extension or development of the practical utility of vital statistics, and which but for urgent necessity I would gladly have left out of consideration, for in a measure it is to me a painful duty. You are all aware that in this State our vital statistics are in the first instance collected by the city clerks, and while there are certain reasons why this should be the case, in the light of the development of modern preventive medicine it is no longer desirable that this duty should fall to a class of men totally unfamiliar with the medical aspects of the data they are expected to register for the use of medical practitioners and sanitarians. This is not as it should be, and I urgently recommend that early steps be taken tending to a change in the law, and transferring this important duty from the city clerks to the local board of health or to a medical registrar of vital statistics, especially appointed for that purpose. In certain other States we have a still more antiquated system by which the Secretary of State is made the custodian of the vital statistics and under his supervision the statistics are compiled, published, and analyzed. This is contrary to the purpose of collecting vital statistics, since one totally unfamiliar with the essential requirements and needs of the science cannot be expected to do justice to the task imposed upon him. In consequence of this anomaly, vital statistics are in

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many States collected without due skill and proper consideration of important details, while at the same time they are not in time placed before a trained medical observer for immediate consideration, verification, and correction. Gross errors must needs result from so antiquated and unwarranted a practice, which owes its origin to a time when certificates of marriage, birth and death served merely the legal purpose of establishing proofs of identity, but at the present time the legal aspect of these certificates is but subordinate to the far more important one of the State supervision of the public health, and hence the urgent necessity that the duty of collecting vital statistics in the first instance be transferred from the city clerk to the medical officer of health, or to a duly appointed medical registrar of vital statistics.

I cannot do better than illustrate the importance of this point by a reference to a slightly different matter, which at the same time will make clear to you the inexpediency of placing the collection, and, even worse, the analysis, of vital statistics in the hands of a State officer not directly connected with the sanitary administration or the preservation and improvement of the public health of the people of a State. Curiously enough, the illustration of which I shall make use is furnished by the State from which you would least expect so sorry an exhibition of ignorance and perversion, if not desecration, of a high public office, and at the same time of such utter indifference, if not contempt, of public requirements and public needs. In the State of Massachusetts vital statistics are also in the first instance collected under the authority of the Secretary of State, and it is by the authority of this same officer that the returns are annually published and analyzed by some one designated for this purpose. For forty-nine years, ending with 1890, this duty had been delegated to men trained in public health matters, to men thoroughly familiar with the science of vital statistics, to men deeply interested in the development of the highest degree of accuracy and skill, combined with a desire to make the vital records of the State attain to as high a degree of public utility as possible. During these forty-nine years, the science of vital statistics had been more highly developed in Massachusetts than in any other State of the Union, and the registration reports edited by the foremost men and authorities in the science of vital statistics had reached a point of public approval such as has never yet been

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attained by any other State of this country. One would have expected where so high a degree of public utility had been reached, and where this important duty of study and analysis of the vital records had been developed to the complete satisfaction of the public, as expressed in the medical journals and other competent channels of public opinion, that it would have been impossible to ruthlessly destroy or to tear down the work of earnest men for half a century. Yet, without warning, without right, without justice, the Secretary of State in 1891 transferred this important duty away from the secretary of the State Board of Health to an unknown individual, who has since to the discredit of Massachusetts made the registration reports of that State not only a sorry evidence of his own ignorance, but an evidence of the indifference of the intelligent people of Maasachusetts to an act of iniquity on the part of a high officer of State, such as is, probably, without a parallel in the history of vital statistics in the civilized world. The registration reports of Massachusetts, as they have been issued since 1890, contain not hundreds but thousands of errors, the majority of which are inaccuracies and misstatements, which even a high-school graduate, trained in simple arithmetic, would not be expected to make. The reports are full of fallacies, full of discrepancies, and are today a discredit to the people of Massachusetts, and a discredit to the science of vital statistics, and a direct step backward in the development of the point to which I have called your attention, namely, the development and extension of the practical uses of the science of vital statistics.

I would not have spoken of this perversion of a high public duty, and of the undoing of the good work of able and earnest men for half a century, were it not that I believe it to be our duty to recognize dangers which confront us in this State as much as they are present in every other community. I believe that it is only by the strictest vigilance exercised on the part of the public and of individuals who have the best interest of the people at heart that so difficult a task as the one in which you are engaged can be carried successfully onward from year to year. The results which follow the efforts of sanitarians are alway remote, and more often benefit future generations than the people of the time who have to bear the immediate burden of expense. Hence this digression into a chapter of vital statistics, which to my mind records the most unfortunate and shameful betrayal of a public trust.

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In conclusion, I may be permitted to touch once more, if ever so slightly, upon the value of vital statistics to the people of this State in other directions than the specific one of the inquiry into the diseases of the working people employed in the different industries recognized to be either unhealthy or dangerous, or both. We are in the last year of a century which marks a progress in sanitary science during fifty years such as has not been made during all the thousands of years of civilization which have preceded it. I believe it is not going too far to say that at no time in the world's history have the people been housed as well, have they been nourished as well, and have they in all respects lived as long and as well as the majority of our people do at the present time. But the problem which will confront us in the twentieth century more than in the nineteenth is the enormous growth of our large cities and the immense aggregation of millions of people upon a small area, such as we find to be the case in Greater New York, Greater Philadelphia, and even Greater Newark. The census returns for 1900, as far as they have been published, disclose a tendency of which I believe the people of this State should take early advantage, namely, the tendency of recent times on the part of the more intelligent people to leave the large cities and settle in the more healthy and more advantageous portions of the surrounding territory, where under semi-rural conditions they can enjoy a degree of happiness and health such as under the best conditions is not possible in the crowded centres of population. I believe that this tendency will become more confirmed, will become a more definite phase, during the next quarter of a century, and that it will prove of benefit to the people of this State, who from New York and Philadelphia will draw the best elements of the population as a new class of suburban residents in far greater numbers than has ever been the case before. But public intelligence has now reached a degee of development very considerably above that which prevailed a quarter of a century, or even a decade ago. Today, more than at any time in the past, do people inquire into the health factors of a community and the conditions making for a healthy and long life, and only in proportion as our cities and country sections hold out inducements in this direction, and make clear beyond a shadow of a doubt that our State is healthy and advantageous from this point of view, will we attract in the very near future the overflow of the intelligent and

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desirable population of New York and Philadelphia, which will do much to aid us in the more rapid development of this State. I believe I am not going too far when I say that on the basis of my own investigation, and my own personal inspection of nearly every part of northern and southern New Jersey, I am warranted in the emphatic assertion that this State offers advantages for the health seeker and the home seeker such as cannot be found within a hundred miles of any other large city of this country. We have a State offering every variety of natural advantages, the seashore, the mountains, proximity to large forest areas, and even a lake country such as England itself has little more of beauty and attraction to boast of. You cannot extend the practical utility of vital statistics in a more beneficent direction than by giving strong encouragement to the local health officers of our cities and towns, and to all our physicians practising in the different sections of this State, in collecting and publishing the actual facts as they pertain to the longevity of the people of this State. Just in proportion as we thus demonstrate the practical value of vital statistics to the people at large, shall we gain for our State an increasing degree of public approval, which is so desirable and so fully deserved.

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MISCELLANY AND NOTICES.

CLASSIFICATION OF CAUSES OF DEATH.

It may seem presumptuous to attempt a criticism of the Bertillon classification of deaths after the indorsement of that system by the American Public Health Association, and by the representatives of France, Austria, Italy, and many other European and South American states at the International Congress of Paris in 1900. Indeed, the necessity for a uniform schedule of the individual diseases and an accurate definition of the limits of each is so obvious that this part of the work must commend universal approval. Uniformity in the classification or grouping of these diseases is, however, not so indispensable; and, in this respect, Dr. Bertillon's scheme departs so widely from the systems at present in use in this country and in England, that there can scarcely be too thorough a discussion before undertaking it.

The systems of classification now used in English-speaking countries are modifications of the system proposed by William Farr in 1855. Dr. Bertillon stated to the International Commission last summer that this system was based on the seat of the maladies involved and not upon their nature, and claimed that his scheme was drawn on the same lines. It is difficult to see how this statement was allowed to go unchallenged. Dr. Farr's scheme, including under zymotic diseases the groups miasmatic, enthetic, dietetic and parasitic, and under constitutional diseases the diathetic, and tubercular groups, is a purely etiological one, and only of the local diseases, where the organ affected is necessarily considered, is Dr. Bertillon's statement correct.

The reasons for discarding the classification of diseases according to their nature appear to be two: that such classification is based upon theories of etiology which change with the progress of medical science, and that it leads to the use of group death rates which are misleading and valueless. The latter objection may be dismissed without argument; it will presumably be possible to discourage the use of group death rates by less radical means than confusing the returns so that they cannot be obtained. The former objection is un-

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doubtedly a valid one; the only question is whether the progress of medical science is not certain to make alterations necessary in any system whatever. Apparently the International Commission considered that this was the case; as it expressly resolved, "*Qu'il est désirable que cette nomenclature soit revisée tous les dix ans.*"

Furthermore, it is among the individual diseases, exactly where comparability is most needed, that the most radical changes are likely to occur, and the modifications of the general classification must be insignificant in comparison. It is, of course, true that any system founded on a theory is imperfect and subject to change; but surely such a system is better than one founded on no rational theory whatever. A scientific classification, according to etiology, is a hard task, but I think a brief examination of Dr. Bertillon's tables will show that a scientific classification, according to the affected organ, is still more difficult.

The classes into which diseases are divided, according to the new system, are fourteen in number, as follows: general diseases, diseases of the nervous system and the sense organs, of the circulatory system, of the respiratory system, of the digestive system, of the genito-urinary tract and annexa, puerperal diseases, diseases of the integumentary system, diseases of the organs of locomotion, malformation, diseases of infancy, diseases of old age, external causes and causes ill-defined. In spite of this lengthy list the incongruous collocation of diseases is the first result which strikes one on an examination of the Bertillon tables. Thus we find typhoid fever, diabetes, and gout in the first group; tetanus, cretinism, and cataracts in the second; and penumonia, and polypi of the nasal cavity in the fourth.

With regard to tuberculosis and cancer the new system breaks down at once. Whereas each death is supposed to be classified according to the seat of the disease, all affections due to these causes are placed under the first great group of general diseases, which are defined as those which affect the entire organism, so that it is not possible or reasonable to refer them to any special part. Thus under this heading comes tuberculosis of the lungs as a general disease; pneumonia is classified as a disease of the respiratory apparatus. Cancer of the buccal cavity is a general disease; affections of the mouth form a sub-head under the diseases of the digestive tract. Dysentery and cholera nostras are general diseases; diarrhœa and

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enteritis are diseases of the digestive tract. Anthrax is a general disease; carbuncle is a disease of the integumentary system. It is, perhaps, to be expected that cerebro-spinal menigitis should be classed as a disease of the nervous system; but to find peritonitis placed among the diseases of the digestive system, and puerperal septicæmia as a disease of puerperium, make one wonder just what a "general disease" may be. It is a relief to find tetanus a desease of the nervous system and not classified as an affection of the digestive tract on account of its effect on the organs of mastication.

Surely this scheme furnishes sufficient evidence of the impossibility of securing a rational classification of diseases according to the part of the body affected. The same disease may produce such a different effect with different individuals and at various periods in its course that such a system must entail endless confusion. Logically, it would require that a single case of typhoid fever be classed as a disease of the digestive tract and of the circulatory system and of the spleen at different periods in its course. Is there then no other refuge, as Dr. Bertillon implies, but the alphabetical arrangement of the causes of death? Such an alphabetical arrangement might, indeed, be preferable to a classification which does not classify. There is, however, another alternative,— the modification of the old etiological system to conform with present medical knowledge, making a system, subject to future change, indeed, but having a rational and scientific basis.

Just such a modification of the etiological system has been attempted by the registrar of vital statistics of the State of Rhode Island. In this scheme the general plan of Dr. Farr has been retained, with just such modification as will bring it into harmony with scientific facts. The titles of the five general classes,— zymotic, constitutional, local, developmental, and violent deaths,— are unchanged. Under the class, zymotic, the title of the first group is changed from miasmatic to communicable; the diseases included are much the same as in the old system with the exception of rheumatism, and with the addition of the whole of Farr's second group of enthetic diseases, syphilis, hydrophobia, glanders, and malignant pustule. The third, or dietic group, is retained for alcoholism, inanition, and purpura and scurvy; but the fourth, parasitic, group (thrush and worms) is combined with the communicable diseases.

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The tubercular group under the second class of constitutional diseases is also transferred bodily to class zymotic, group communicable; thus the second class includes only the diathetic group, anæmia, cancer, and rheumatism. The changes under the last three classes, of local, developmental, and violent deaths are less sweeping. Pneumonia is transferred from diseases of the respiratory organs to the communicable group; peritonitis is dropped as being usually secondary; appendicitis, colitis, enterocolitis, dysentery, gastro-enteritis, and acute gastritis are introduced. A somewhat elaborate classification of the diseases of child-birth is given, and the group of diseases of nutrition is omitted. Finally, still-births, deaths from cause not stated, and from cause ill-defined are tabulated by themselves. This last group includes such indefinite terms as blood poisoning, coma, debility, heart failure, inflammation, septicæmia, shock, etc.

If we compare these two systems from a practical standpoint the second is surely to be preferred. Vital statistics are studied mainly with reference to the cause of disease. Any plan which groups them on an etiological basis must therefore be the most convenient one, for it enables the sanitarian, or the hygienist to see at a glance all those factors of the death rate which are subject to the same laws of causation, and which are amenable to the same preventive measures.

Theoretically, no classification can be natural or rational which is not based on descent or on affinity of cause. Every physician when he makes a diagnosis classifies the disease according to the cause, of which, or of the reaction of the organism against which, the symptoms are a manifestation. Dr. Bertillon recognized this law when he established his thirteenth class of diseases due to the external *causes*; but if he had been logical he would have omitted this group; and he would have classed death by freezing as a general disease, and dog-bites as integumentary diseases or circulatory diseases or diseases of the organs of locomotion, according to the depth of the wound. Any etiological scheme, like that of Rhode Island, will be imperfect; but it is capable of correction with the advance of medical knowledge. The defects of the Bertillon plan, on the other hand, are inherent in its false principle; and the inconsistencies noted above could be removed only by the introduction of others still more glaring.

C.-E. A. Winslow.

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EMPLOYER'S LIABILITY.

The New York Bureau of Labor Statistics, in its seventeenth annual report, presents a large variety of statistics upon interesting topics, including over five hundred pages upon the "The Economic Condition of Organized Labor," showing the number of members of labor organizations, the amount of unemployment and of employment, the quarterly earnings, and the daily rates of wages.

The remainder of the book, amounting to over seven hundred pages, is devoted to a study of "The Compensation of Accidental Injuries to Workmen," which is by far, the most valuable presentation of the subject that has yet been made to American readers. It is introduced by a chapter upon "Accident and Accident Insurance in New York," the reports concerning accidents being returned by railway companies, factories, and mines, and statistics of various sorts being drawn from these returns. Statistics likewise of the amounts of accident insurance and the benefits, and also forms of the policies written are given.

This is followed by a chapter upon "Employers' Liability in England and America," in which the author considers the employers' liability at common law, and the development of this branch of law in both Great Britain and the United States. He also presents statutory modifications of the law as in Massachusetts and other commonwealths and proposed legislation in New York. Since the appearance of this book, Governor Odell has in his message recommended that some amendment to the law be made. In appendices to this chapter there are presented the English Employers' Liability Act of 1880, the Asquith Bill of 1893, which was passed by the Lower House and rejected by the House of Lords, and the English "Workmen's Compensation Act of 1897." The appendices also include statistics of accidents in Great Britain, and a complete collection of the Employers' Liability Laws of the United States and of the liability bills introduced in New York during 1900.

From the consideration of these laws in England and America the author passes to the consideration of similar laws in other countries. He first takes up the laws of Germany, which are reasonably familiar to American readers. He describes their operation and gives statistics concerning the same, with great fullness. He also makes a summary

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of the results of the laws and adds three appendices, two being translations of the laws themselves and one, statistics of the insurance system.

When he leaves Germany he goes into a field which is unfamiliar to most American readers, and he takes up a class of legislation which has completely revolutionized the attitude of the law toward claims by workmen for compensation for injuries inflicted when they are at work. Because Austria was the first country in which laws of the strictly new type were enacted, he first presents an account of this legislation in that country. He also presents a translation of the accident laws, with all amendments and extensions thereof, and statistics of their operation.

In chapter five he continues by giving the laws of Norway, Finland, and Denmark, which are based upon the same principle as the Austrian law; and in chapter six he proceeds to give the laws of Italy, France, and Spain, which are likewise upon the same principle.

In chapter eight the laws in all other countries of Europe, and of New Zealand, are considered. In most of these countries, excepting the last mentioned, the laws are still of the old type.

It thus appears that in this one book is gathered together complete translations of the employers' liability laws of all the the important countries of the world, including the States of the United States, separately. It also contains statistics, showing their operation, a discussion of the principles upon which they are based, and synopsis of the arguments in favor of their adoption. The value of such a compilation can scarcely be exaggerated.

It is no part of the intention of the writer of this review to attempt to forestall the book itself in explaining to its readers the nature of these different laws; but it is impossible to refrain from saying that the new class of legislation, which has spread from Austria throughout practically all the countries of Europe in less than fourteen years involves a complete change of base in dealing with industrial accidents. One could stop at this point in explaining the matter, if it were not that the reader would be likely to suppose that the change of base is one similar to the change made by the German government under Bismarck from individual liability of employers to a state fund for insurance, contributed by employers, by workmen, and by the general taxpayers. This, however, is not the fact. The laws of

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Austria were based upon the proposition that the damages to individuals, because of industrial accidents, are as much a part of the cost of the product, as is the coal, wear and tear on machinery, wages, or any other element which enters into the production. It was further argued that, under the old system, the larger part of this cost fell upon the individual workmen in a manner, such as to frequently crush them and their families to the great damage of the state; and that there was no means by which it could be added to the price of the product and passed to the consumer, except by taxing it to the employer and requiring him to pay the same. This, of course, was a complete abandonment of the individualistic proposition, that the right to compensation arises out of the failure of the employer to exercise proper negligence and is, to a degree, penal. The Austrian system does not regard this compensation as a matter between the employer and the employee at all, excepting in a merely incidental way. It regards the consuming public as the persons, who should and must pay the entire cost of the product and its mediate payment by the employer as a means of compelling its immediate payment by the consumers. This seems so reasonable, that it has in the short space of fourteen years made its way in all countries of Europe, including the most enlightened and progressive in industrial matters, like Great Britain, for instance, where the bill was carried through by the conservative government, and including also the least progressive in industrial matters, like Italy and Spain. As a result of these laws, almost one hundred per cent of the industrial acccidents are compensated in a reasonable degree, the amount of compensation being fixed by the law; while, under the operation of the laws of the United States, not more than from about five per cent to seven per cent on the average are compensated at all, and very frequently these fortunate claimants recover excessive judgments for damages, the proceeds of which are divided with lawyers, who take the cases on shares.

It is altogether probable that the publication of this valuable information, so difficult of access, by the Bureau of Labor Statistics of New York, will lead to a movement in the United States to establish similar legislation, and in any event this report is one which no statistician or student of political economy can afford to be without.

MILES MENANDER DAWSON.

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QUARTERLY BULLETIN: BUREAU OF ECONOMIC RESEARCH.

Bulletins Nos. 1 and 2, published quarterly by the (New York) Bureau of Economic Research, undertake "to reduce the more important industrial and commercial statistics (of the United States and its chief cities) to a basis of percentages or 'index numbers.'" The first number of the bulletin gives yearly averages for 1878–1900; the second contains quarterly and monthly averages for the same period.

"The method of computing the index numbers here adopted consists in finding the average price of each article for the ten years 1879–1889 (crop year, July 1st to June 20th), and giving to that the value of 100. All other quotations of the same article are then expressed in percentages, or 'index numbers,' of this base. For example, the average price of spring wheat No. 2 on the Chicago market for 1879–1889 was 94 cents. Giving to this the value of 100, the average price, 71 cents, for the the year 1898–1899 was 76, relative to the base, 94. In other words, the average price of wheat in 1898–1899 was 76 per cent of the average price for 1879–1889, and 76 is the 'index number' for the year. The 'index number' for wheat for the week ending June 9, 1900, was 72, the price being 68 cents. Sixty-six commodities are treated in this way; . . . to find the general price level of all commodities for a given year, all of the index numbers of the 66 articles for the year are added together and their average is the general index number for the year."

Index numbers, thus, "are nothing more nor less than *percentages*, and they show the *relative movements* in prices. It must never be thought that they involve an attempt to find an average of the prices of a bushel of wheat. . . . A general index number is not an average of prices but an *average of the ratios* between prices." The purpose of the index numbers is "not to find an unthinkable average of prices, but to show from year to year and month to month the relative prosperity of different classes of the community, in as far as this can be shown by the changing prices of what they buy and what they sell."

"The reasons for selecting the years July, 1879, to June, 1889, as the base are partly because these years mark the beginning of the present period of specie payments."

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The index number methods of Sauerbeck and of the *Economist* (for England), of Conrad (for Germany), of Atkinson (for India), and of the Bank of Japan have been translated into the system here employed, that valuable comparisons may be made.

The 66 articles referred to above have been divided into groups and sub-groups as follows: —

Group I. Live stock; "a group in which the supply does not quickly respond to increased demand, and which, therefore, shows excessive rise in times of prosperity."

Group II. Animal products; "a group produced from Group I, but showing less extreme fluctuations."

Sub-group 2. Slaughter products.

Sub-group 3. Dairy products.

Group III. Agricultural products; "a group of unlimited supply, *i. e.*, a group which can be reproduced in a single season."

Sub-group 4. Breadstuffs.

Sub-group 5. Plants and fibres.

Group IV. "A group of limited supply, *i. e.*, a group which is not *reproduced* but is *found* under or on the earth's surface."

Sub-group 6. Metals.

Sub-group 7. Minerals and lumber.

Group V. Manufactured products.

Sub-group 8. Iron manufactures.

Sub-group 9. Mineral manufactures.

"Both sub-groups 8 and 9 are manufactured mainly from crude materials of limited supply."

Sub-group 10. Manufactured agricultural products, *i. e.*, "articles manufactured from crude materials of unlimited supply."

Besides numerous tables describing the articles and authorities considered in the making up of index numbers, there are employed to illustrate and supplement the index number lists a number of well-selected charts which show graphically the variations in the commodities.

As an example of the method of describing and classifying articles we subjoin portions of one of the tables of the *Bulletin*: —

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DESCRIPTION OF THE ARTICLES AND AUTHORITIES.

Articles.	Market.	Description and Authority.	Weighting on Basis of American Product.
Cattle.....	Chicago.....	Native steers, top price, average weekly. *Board of Trade.*	One-sixth of farm value (Department of Agriculture) estimated as annual slaughter.
Hogs.....	Chicago.....	Packers' and shippers' heavy, top, weekly averages. *Board of Trade.*	One-half farm value.
Glue.....	New York....	Medium white. *Oil, Paint, and Drug Reporter.*	Census 1890, other years estimated.
Eggs.....	New York....	Nearby, prime to fancy. *Produce Exchange.*	Same as butter. [Butter is given previously in the list.]
Pig Iron...	Philadelphia..	No. 1 Anthracite Foundry. *Iron Age.*	American Iron and Steel Association.

E. H. D.

VITAL STATISTICS OF THE ARMY.

The *Report of the Surgeon-General of the Army* to the Secretary of War for the year ending June 30, 1900, contains a tabulation of the annual death rate per thousand among the volunteer and regular troops serving in various countries occupied by the U. S. during 1898 and 1899, of which the following is an abridgement: —

	United States.		Cuba.		Porto Rico.		Philippine Islands.	
	1898.	1899.	1898.	1899.	1898.	1899.	1898.	1899.
All Causes.								
Volunteers.....	24.41	7.26	86.00	16.46	52.09	10.53	24.70	29.88
Regulars.....	20.14	8.28	98.16	19.55	41.45	11.35	22.74	31.10
Gunshot Injuries.								
Volunteers.....	.43	.62	11.91	.62	1.86	..	2.86	16.81
Regulars.....	1.21	.57	33.33	.92	1.04	.60	3.10	9.60
Typhoid Fever.								
Volunteers.....	16.59	1.19	22.05	2.72	40.66	2.63	9.28	2.20
Regulars.....	8.79	.99	14.17	5.26	22.80	2.69	7.58	3.58
Yellow Fever.								
Volunteers.....	.01	..	15.88	.12	..	..	..	..
Regulars.....	.08	.11	17.57	4.17	..	..	..	..
Malarial Fever.								
Volunteers.....	1.26	.37	14.77	3.71	2.92	..	1.43	.43
Regulars.....	2.24	.12	13.12	1.67	5.70	..	1.72	1.23

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The high death rate rate in Cuba is notable; even in 1889 although diminished 80 per cent it was excessive. The high rate in the United States during 1898 is partly attributable to imported cases from other regions but not wholly, as one remembers the conditions in certain army camps. The Philippine Island death rate was low during 1898 for troops in a tropical climate; in 1899 the increase of fatalities from gunshot injuries contributes markedly to raise it nearly one-half. With this exception all the rates were much decreased in 1899 among regulars as well as volunteer, showing the effect of immunity, acclimatization, and natural selection. The regular troops show lower rates from the contagious diseases than the volunteers, whether from better general physical condition or more intelligent sanitary precautions on the part of their officers. Their large excess of mortality from gunshot injuries is a tribute to their gallantry; but in the Philippines, during 1899, the volunteers appear to have been exposed even more than the regulars.

Typhoid fever was especially prevalent in Porto Rico during 1898; while yellow fever and malarial fever attained their maximum in Cuba during the same year. From a set of tables, showing the cases and deaths in each month from certain diseases for 1899, the following table is compiled, those two diseases having been selected which show well-marked seasonal variations: —

CASES PER 1,000 MEAN STRENGTH, 1899.

Months.	Typhoid Fever.				Diarrhœal Diseases.			
	United States.	Cuba.	Porto Rico.	Philippine Islands.	United States.	Cuba.	Porto Rico.	Philippine Islands.
January	.9	2.0	1.6	1.9	5.5	27.7	48.6	20.5
February	.3	3.1	1.8	.8	4.0	38.0	33.0	16.6
March	.4	3.6	.8	1.2	5.1	33.8	32.1	30.0
April	.7	7.3	.3	1.6	7.9	37.1	43.5	40.0
May	1.0	5.4	2.5	2.1	9.4	53.5	60.1	85.6
June	1.0	3.6	.6	3.7	12.1	52.8	93.5	97.3
July	1.2	3.6	3.1	2.0	14.0	47.9	52.8	107.4
August	1.1	3.2	.3	2.0	18.7	46.9	37.1	79.4
September	2.5	2.2	.3	2.4	10.2	31.3	44.5	54.5
October	.7	1.3	1.0	1.6	6.8	31.4	42.5	44.4
November	.5	1.3	1.1	1.4	3.6	25.1	33.8	34.1
December	.3	1.5	.3	1.3	3.1	20.6	35.6	28.9

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It will be noted that typhoid morbidity in the United States rises regularly from a minimum in February to a maximum in September, while in Cuba the minimum is in October, and the maximum in April, forming almost a complementary curve. In Porto Rico and the Philippines the curve would be less smooth, but in both cases the highest rates lie between May and July, with the smaller values at the end of the year. The curve for diarrhœal diseases would be exactly similar but somewhat more even on account of the greater number of cases. The final tables at the end of the Surgeon-General's report furnish striking evidence of the dangers of tropicial service in the comparison of various rates with those of the army for the decade, 1888–1897. Thus the admissions for diseases per 1000 mean strength of the total army were 2006 in 1898, 1987 in 1899, and 893 in the previous decade. The death rates from all diseases were 25.0, 11.8, and 4.5 for the corresponding periods. The admission rates for typhoid fever were 141.6, 20.7, and 4.9; for yellow fever they were 7.9, 2.5, and .03; for intermittent malarial fever they were 413.7, 391.1, and 62.8.

C.-E. A. W.

NOTES ON VITAL STATISTICS.

The *Thirty-sixth Annual Report of the Registrar-General of Ireland* for 1899 contains, like all the English blue-books, much valuable material. Of special interest is the tabulation of marriages according to the mode of celebration, and the ratios of the same to the corresponding estimated populations, because such data are rarely obtainable. The marriage rate for Roman Catholics has ranged from 4.04 to 4.62 since 1889, with an average of 4.34. The corresponding average rate for members of the church of Ireland and Protestants is 6.12, with extremes of 5.80 and 6.53. The reviewer is at a loss to say whether this striking and constant discrepancy is due to some error in the collection of data or whether it indicates some correlation between religious faith and racial character, or economic conditions. A curious difference in seasonal distribution is brought out in the table giving the marriages by quarterly periods. For Roman Catholics the equivalent annual rate for the four quarters of the year for ten years,

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1889–1898, averaged as follows: 6.4, 3.8, 3.6, 3.6. For all other marriages the corresponding figures were 5.2, 6.0, 6.5, 6.6. The diagram in the report which shows the mortality from twenty-two causes of death during the year throws some discredit on the system of registration,— because old age occupies the first place on the list being credited with a total of 14,216 deaths. As vital statistics improve this cause of death steadily declines in apparent importance.

Dr. Symons, Medical Office of Health of Bath, England, in an article on *Local Statistics* in the February, 1900, number of *Public Health* notes the importance of referring birth and death rates to special age and sex groups, rather than to the total population. He points out that in Bath there are only 275 children under 15 years of age to each thousand of population, while in England and Wales there are 351; therefore, death rates for children's diseases if referred to total population should be corrected by a factor of 1.275. Again, there are only 154 "young married women" in Bath as against 170 in England and Wales, so that marriage rates should be multiplied by 1.105.

Dr. Thomas Oliver in an address on the *Physiology and Pathology of Inheritance*, published in *The Lancet* for November 10, 1900, gives some statistics for tuberculosis derived from several insurance companies on both sides of the Atlantic. The records of the New York Mutual Life Insurance Company show that the ratio of deaths from tuberculosis to total deaths, in families without consumptive history, fell from 35.8 under 29 years of age to 26.3 between 30 and 30 years, and to 17.6 between 40 and and 49 years. In families with such history, on the other hand, the corresponding figures were 51.6, 39.6, and 24.6. The conclusion from these tables is that a family history of phthisis indicates an increased liability to this disease of 30 per cent up to the age of 50. The statistics of the Scottish Widows' Fund, on the contrary, show less difference, the percentage of consumptives among children of phthisical and non-phthisical parents being 8 and 7, respectively. Statistics of insurance companies can, however, only be interpreted by one familiar with the exact conditions which govern their collection in the individual case.

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A brief but valuable paper by Sir H. R. Beevor, M.D., in the *British Medical Journal* for August 18, 1900, is on the subject of "Rural phthisis and the insignificance of case-to-case infection." The author discusses the death rate for this disease in the eighteen rural districts of Norfolk county for the three decennia from 1861 to 1890 in the population between the ages of 25 and 45. He shows by a table and a diagram that in almost every instance there has been a marked fall between each period. The first five districts, taken alphabetically, give, for instance, the following results: —

1861-70.	1871-80.	1881-90.
4.27	3.09	2.70
4.00	3.33	2.45
3.43	2.81	2.46
3.36	2.57	2.53
4.39	3.57	2.38

The striking fact, however, is the constancy of rate in each period among the different districts,— that is, the variation between the rates for different periods in the same district were much greater than the variations between different districts in the same period. The author draws the just conclusion that general sanitary conditions which affect all these districts alike have played a greater part than infection which must have varied with the locality. In other words, phthisis is a disease in which the germ is widespread and the factor of vital resistance occupies a prominent place.

The Year-book of the Health Department of the city of Ghent contains some interesting compilations of the death rates, for 1899, of various European cities, ranging from Amsterdam, 15.3; through Hamburg, 17.4; Berlin, 18.8; London, 19.2; Dresden, 19.5; Paris, 20.1; Vienna, 20.7; Venice, 22.8; and St. Petersburg, 24.7, to Rouen, 29.6. Another table gives the death rate from tuberculosis in forty-nine cities, of which the following may be quoted: Liège, 1.69; London, 1.79; Rome, 2.20; Berlin, 2.38; New York, 2.80; New Orleans, 3.78; Paris, 3.92; Nuremberg, 4.70. No authority is given for these figures. A diagram at the end of the report indicates the relative intensity of certain causes of disease in a rather striking fashion, each cause being represented by a segment of a circle and a separate circle representing each month.

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Clément Juglar in a brief communication to the *Journal de la Société de Statistique de Paris* (November, 1900, p. 386) criticises the expression of birth rate, as referred to total population, as calculated to obscure the true relations of things. He points out that quite considerable differences in actual numbers of births are reduced by this ratio to slight variations in the first place of decimals. He objects also to the masking of yearly differences by combinations into five and ten-year periods and maintains that a consideration of the actual figures for a long period of years, and especially of the maxima and minima, can give the only just idea of the progress of affairs. M. Juglar illustrates his system by analysis of the figures for births in France from which he draws alarming conclusions. This illustration detracts considerably from the author's argument, because it shows how easy it is by comparing the maximum of three years at one period with the maximum of ten years at another, and the actual number of births in one year with the maximum of a previous period and by disregarding the population, to prove anything whatever. The method commonly used may not be spectacular, but it is reasonably safe.

The *Journal de la Société de Statistique de Paris* for May, 1900, contains an interesting addition to the growing list of studies which aim to connect statistics of births and marriages with economic conditions. The author, Clément Juglar, refers to a table of marriages in Switzerland presented at a previous meeting of the society by Fahlbeck, and points out the falling off in marriage rate due to the Crimean war, Civil war in the United States, the panics of 1873 and 1882, and the Baring failure of 1890. Juglar then gives a table which shows the effect of these latter disturbances in France and England, in Paris and London, on marriages and legitimate births. In the year of the panic, or the financial crisis, the marriage and birth rates reach a maximum, and in the succeeding period of depression fall to a minimum. The French marriage rate, for instance, was 352 in 1873, 278 in 1879, 289 in 1882, 269 in 1886, 290 in 1890, and 282 in 1895. The table is unfortunately not given in full, only the extreme points being tabulated, but the author states that the curve between the points is a regular one.

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The *Forty-sixth Registration Report of the State of Rhode Island*, for 1898, is marked by the adoption of the geometrical ratio for the calculation of population. Besides the usual routine material there is given a tabulation of the deaths for forty-six years by occupations, with the average ages of decedents. Such data are not of great value for specific avocations; first, because the base for calculation is too small; and second, because many of the occupations recorded presuppose a more or less definite age. Thus, it is not surprising that the average age of decedents, classed as "judges and justices," as "sextons," and as "sea captains or ship-masters," should be high; or that the corresponding figures for "ball players," "students," and "actresses" should be low. The figures for groups of occupations are of interest, however, although the system of grouping used in this case is neither clear nor logical. The average ages of decedents in the groups adopted, from June 1, 1852, to December 31, 1898, were as follows: Tillers of the soil, 66.69; optional activity, 55.91; professional and personal, 54.00; outdoor, local, 53.27; indoor, active, 50.71; occupations at large, 49.32; indoor, activity restricted, 45.04. Another valuable table shows the ratio of male and female births by years since 1864. The ratio of males born to 100 females ranges from 100.3 to 112.9, and averages 104.8. In colored children, on the other hand, the ratio, since 1886, has averaged 97.0. The classification of causes of death adopted in this report is a most excellent one, and is referred to more at length elsewhere.

The *Monthly Bulletin of Vital Statistics of the Michigan State Board of Health*, for November, 1900, is noteworthy for the attempt at a partial registration of morbidity in the towns and other registration districts of that State. The presence of cases of pulmonary tuberculosis, diphtheria, scarlet fever, measles, small-pox, typhoid fever, whooping cough, and cerebro-spinal meningitis in any city, village or township is indicated by the letter "s" in the proper column. This innovation must prove of great value for practical purposes; its statistical importance would be vastly increased if it could be made quantitative.

The *Thirty-first Annual Report of the State Board of Health of Massachusetts*, for the year 1899, contains many indications of encourag-

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ing sanitary progress. The mortality from typhoid fever shows a falling off as follows: —

DEATH RATE PER 1,000 INHABITANTS.

	1871-75.	1876-80.	1881-85.	1886-90.	1891-95.	1896-99.
In the cities	8.2	4.2	5.1	4.6	3.4	2.6
In the whole state.....	8.2	4.5	5.0	4.1	3.2	2.5

The death rate from consumption has fallen with similar steadiness from 41.1 in 1851–55, to 34.6 in 1871–75, to 23.1 in 1891–95, and 21.7, 20.8, 19.4 and 18.7, respectively, in the four years, 1896, 1897, 1898 and 1899. The ratio of reported deaths from consumption to deaths from all causes has fallen since 1890 from 130.0 to 99.5. As usual a valuable chapter of the report is devoted to the fatality from certain infectious diseases. The fatality from typhoid fever in 1899 was 17.7, a little below the average of the years, 1891–99, which is 18.9. The average fatality of scarlet fever for the latter period has been 5.3, and that for measles, 1.2. The diphtheria statistics are grouped in two tables; in the pre-antitoxin period, 1891–94, the fatality was 28.3; in the period, 1895–99, it was 14.9. Similar figures from the English local government board are given for comparison. They are somewhat higher, except for typhoid fever; all such figures are probably excessive on account of the uncertain reporting of light cases.

The *Annual Report of the Department of Public Health of Newark, N.J.*, for 1899, contains somewhat fuller statistical information than has previously been published by that city, in particular tables of reported cases of infectious diseases by months, which show the connection between diphtheria and scarlet fever and the school year, and that between water-borne typhoid fever and spring floods. The value of the table of deaths by ages is diminished in value, because ages from "twenty to sixty years" are massed together. The following table showing the value of diphtheria antitoxin is interesting as showing the advantage of the treatment and also an apparent diminution in the natural virulence of the disease: —

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PER CENT OF DEATHS TO CASES.

Year.	Antitoxine Used.	Antitoxine Not Used.
1895	13	23
1896	12	31.4
1897	11	18.7
1898	10.5	17.4
1899	8.7	14.5

In the *Annual Report of the Health Department of Louisville, Ky.*, for the year ending August 31, 1900, are tables of mortality from contagious diseases compared to the cases of such diseases reported. The ratio of 417 deaths from consumption to 195 cases reported forcibly illustrates the difficulty of securing notification in this disease. A table of the comparative mortality in various cities in the United States for 1899 is given in this report, which shows the advantage of a liberal estimate of population in securing a low death rate. Some of the lowest death rates may be quoted with the populations on which they were calculated and the actual populations in 1900: —

City.	Death Rate. 1899.	Estimated Population. 1899.	Actual Population. 1900.
St. Paul	6.43	215,582	163,065
Omaha	6.86	140,000	102,555
Minneapolis	8.74	225,602	202,718
Indianapolis	10.83	195,000	169,164
Cincinnati	13.74	405,000	325,902

Few municipal documents furnish as much information in as clear and concise a form as the *Biennial Reports of the Department of Health of the City of Chicago*. The report for 1897 and 1898, besides full tabulation of statistics for those years, contains a chronological summary of the period, 1851–1898, giving monthly deaths from the more important causes for that period with annual ratios to the population and to the total mortality. The tables are supplemented by diagrams in most cases. The ratio of deaths from a specified disease to the total mortality is helpful and makes clear the contrast between the diseases which are increasing and those which are decreasing. The following table is compiled from a number of those given to illustrate this contrast: —

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PERCENTAGE OF TOTAL MORTALITY.

Year.	1894.	1895.	1896.	1897.	1898.
Cancer and sarcoma	2.69	2.82	3.16	3.55	3.91
Consumption	9.01	8.96	9.96	10.00	10.60
Pneumonia	6.39	9.74	9.23	9.87	10.86
Heart disease	4.32	5.39	5.30	6.25	6.13
Typhoid fever	2.06	2.14	3.23	2.00	2.79
Diphtheria	3.53	5.87	4.12	3.22	2.73
Scarlet fever	0.79	0.32	0.23	0.37	0.29
Diarrhœal diseases	12.28	6.77	6 31	5.64	3.73

Dr. C. A. Lindsley, Superintendent of Registration of Vital Statistics in the state of Connecticut, in his report appended to that of the State Board of Health for 1899 finds cause for congratulation in the workings of a new law regulating the collection of vital statistics. This law does not change the general system which has required reports from doctors, clergymen, justices, midwives, sextons, undertakers, etc., for over forty years, but it provides for a legal county officer whose duty it is to see that the registration laws are obeyed. This provision has "doubled the value of registration and in some towns increased it tenfold." The Connecticut records go back to 1848, forming the longest series in this country, except those of Massachusetts, which extend to 1842. The Connecticut tables, published each year, are very extensive, including births, marriages and deaths by sex, nativity, and parentage; births and deaths by sexes and months; deaths by towns nosologically arranged; total deaths for ten years nosologically arranged; deaths in towns by ages and by months; births and deaths in towns by nationality; deaths by months; age and sex nosologically arranged; occupations and ages of decedents; illegitimate and plurality births and still-births by months and sexes; and various special tables of the zymotic diseases. Of the latter, one of the most significant gives the percentage of mortality from typhoid fever to total mortality in the towns of over 20,000 inhabitants. The ratio for the state is 1.3 per cent, that for the nine large towns is 1.7 per cent. The ratios in Waterbury and Hartford, with water supplies taken in whole or in part from highly polluted streams, were 2.9 per cent and 2.4 per cent, respectively. One may suggest that it is a pity the Connecticut board does not conform to the more logical, and now more general custom, of excluding the still-births from the total record of the births.

C.-E. A. WINSLOW.

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A MATHEMATICAL ANALYSIS OF THE CURVE OF DEATHS AT DIFFERENT AGES.

The statistical and mathematical study of variation, as carried out by Galton and Pearson in England, by Davenport in this country, and by many others, has created almost a revolution in biological methods of research, and marks a great step in the transformation of biology from an observational to a logical science. No contribution to this subject has been more significant than some recent work on the curve of mortality at different ages. This branch of research was first suggested by Professor Lexis (*Einleitung in die Theorie der Bevölkerungsstatistik*, 1875, *Zur Theorie der Massenerscheinungen*, 1877, *Sur la durée normale de la vie humaine. Compte rendu des seánces de Congrès international de demógraphie*, Paris, 1878), who pointed out that, when a curve is constructed with the number of deaths in a population as ordinates and the ages at death as abscissæ, the old age portion of the curve strikingly resembled a normal curve of frequency. Karl Pearson in 1897 (The Causes of Death) applied the more refined methods of statistical study to this problem with remarkable results. First he found that the statistics of French and English mortality could not be made to coincide with Lexis' scheme, — until for the normal curve of chance distribution he had substituted a skew frequency curve, or one in which the mean and the mode do not coincide. A curve of this character, such as is commonly found on plotting the variations in the organs of plants and animals was found to correspond with the actually observed curve for English males; the mean was at 67 years, and the mode at 72. When this portion of the mortality had been removed the curve of the next section of mortality was found to coincide with a second chance distribution curve, centering, with only a negligible skewness, about the forty-second year. A third component curve of the same character had its mode at 23, a fourth had a mode at three years and a mean at six; and, finally, the last 246 deaths out of a thousand may be regarded as lying on a curve, including also an ante-natal mortality of 605, with a mode at about the beginning of the last ante-natal month and extending to the limit of gestation, nine months before birth. The statistics for the first three months are unobtainable; those recorded for the last six months of ante-natal life indicate a

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lower value than that required by Professor Pearson's calculation; but they are, to a great extent, incomplete and unreliable. The standard deviations of these five curves are of special interest; beginning with the old age component they are as follows: 13.4, 12.8, 7.8, 3.5, and .9. The number of deaths per thousand total deaths are 484, 173, 51, 46, and 246 (+ 605 ante-natal deaths).

In the article entitled *La Mortalità nei vari stadi della vita* in the *Bulletin de l'Institut International de Statistique*, xi, 267, Dr. E. Raseri has applied Professor Pearson's method to Italian statistics. He finds himself unable to harmonize still-births and the diseases of infancy with any theory; the diseases of adult life are, however, plotted so as to show the three later components of Professor Pearson's with great clearness. The curve of old age lacks the pronounced skewness shown by the English statistics, indicating a greater stability, and its mode is at 72 years with a standard deviation of 5 years and 9 months; the second curve has a mode at 52 years and a standard deviation of 4 years and 9 months; the third curve culminates at 25 years with a deviation of 7 years, 9 months. The coincidence of the statistical and theoretical curve is even closer than in the English diagrams; the total number of deaths in the component groups during the periods 1890–98 was as follows: —

	Old Age.	Middle Life.	Youth.	Infancy.
Males, . . .	109,229	38,269	48,240	192,282
Females, . . .	111,583	30,757	58,003	174,712

If the analysis of mortality statistics by the application of these four or five curves is found to be applicable to other populations its practical value will be very great. Dr. Raseri appends to his paper a table of deaths from the principal causes, arranged by five-year periods, in which it is clear that bronchitis and diarrhœal diseases contribute mainly to the infantile curve, and typhoid fever and tuberculosis to the twenty-five-year component; while pneumonia attains its maximum in middle life, and apoplexy and diseases of the circulatory system in old age. It is obvious, therefore, that a most significant view of the sanitary condition of a population may be obtained by a comparison of the relative magnitude and position of the component curves. Thus, by comparing Pearson's work with Raseri's, we get the following result: —

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COMPONENT CURVES OF MORTALITY.

	Infancy.	Youth.		Middle Life.		Old Age.	
	Magnitude.*	Mode†	Magnitude.	Mode.	Magnitude.	Mode.	Magnitude.
Italy.....	495	25	124	52	99	72	282
England.....	292	23	51	42	173	72	484

* Per 1000 total deaths. † Years.

It must, of course, be remembered that this sort of study while profitable is also full of pitfalls for the unwary; and one can draw no conclusions from such figures as have been quoted without a thorough scrutiny of the mathematics and of the logic of the investigator.

C.-E. A. WINSLOW.

MICHIGAN VITAL STATISTICS.

The *Thirty-second Annual Report of the Secretary of State on the Registration of Births, Deaths, and Marriages in Michigan for the year 1898.* Edited by Cressy L. Wilbur, M.D., Chief of Division of Vital Statistics. Lansing, Michigan, 1900.

While this report is the thirty-second in a series, it marks a new departure in the history of registration in Michigan, since all of the previous reports were much less complete in consequence of serious defects in the registration laws of the State. Under the new law of 1897 a certificate of death must be presented to the local registrar in every case of death before burial is permitted. Under the old law the statistics of deaths were collected once a year, at the time of taking the annual assessment, and it was estimated that only 60 per cent of the deaths were thus collected.

According to this report for the year 1898 the returns were as follows: —

Total number of births, 1898,	43,462
Birth rate per 1,000 of the estimated population,	18.2
Total number of marriages, 1898,	20,138
Marriage rate (persons married) per 1,000,	16.9
Total number of deaths, 1898,	29,557
Death rate per 1,000,	12.4

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Comparing these figures with those of other States having registration it would appear that while the marriage and death returns may be considered as fairly complete, the birth returns must still be quite defective.

In an appendix to the report the Bertillon system of classification is fully set forth, together with other important material of similar character. Much credit is due to the editor, Dr. Wilbur, for his energetic efforts in the way of securing uniformity of classification in this country. We are pleased to note that he has met with a good measure of success in this direction.

S. W. A.

CENSUS OF HAWAII.

The *U. S. Census Bulletin* No. 15 shows the population of the Hawaiian Islands for the year 1900. There are also included for purposes of comparison the population totals of each island for 1896 and, for Hawaii as a whole, from 1832 on, in six-year periods. A synopsis of the table showing the Hawaiian population from 1832 to 1900 is giving below: —

Census Year.	Population.	Increase or Decrease.	
		Number.	Per cent.
1832	130,313	....	....
1850	84,165	— 46,148	— 35.4
1878	57,985	— 26,180	— 31.1
1890	109,020	+ 51,035	+ 88.0
1900	154,001	+ 44,981	+ 41.2

Each census since 1832, up to and including 1872, showed a loss, the returns in 1872 giving a population of only 56,897, representing a loss since 1832 of 73,416, or 56.3 per cent.

The total land surface of the Hawaiian Islands is, approximately, 6449 square miles, the average number of persons to the square mile at the last three censuses being as follows: 1890, 13.9; 1896, 16.9: 1900, 23.8.

The population, from 1866 to 1900, is given for every district of each of the islands in the Hawaiian group, and also for Honolulu,

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which is practically the only city in Hawaii. "The population of Honolulu in 1866 was 13,521, as compared with a population in 1900 of 39,306, or an increase of practically three-fold in 34 years. The largest percentage of increase during any one period was 45.1, from 1878 to 1884. Honolulu had a population in 1890 of 22,907, showing an increase from 1890 to 1900 of 16,399, or 71.5 per cent."

SCHOOL ATTENDANCE IN RHODE ISLAND.

Mr. Thomas B. Stockwell, Commissioner of Public Schools of Rhode Island, gives in his annual report for 1899 (printed in the *Thirtieth Annual Report of the State Board of Education of Rhode Island*, pp. 67–120) information concerning the school attendance during that year.

The census enumeration of pupils of last year was 79,825, or 526 more than for the previous year. "The greater part of this increase is reported to have attended the Catholic schools, the public schools having lost a small number, and the army of non-attendants having gained. Perhaps this increase in absentees may be more than offset by the fact that the number of those who had attended school less time than the minimum required by law has fallen off more than a fifth; or the actual loss in the number of these short-timers is nearly three times as large as the increase in the number of those not going to school at all."

The number of children between the ages of 5 and 15 years who do not attend school is 2039; over one-half of these reside in Providence or Warwick, while the rest "are scattered quite generally over the whole State." In this regard, Mr. Stockwell calls attention to a recommendation of the factory inspectors in their reports of a year ago and of this year: "that, instead of an *age* limit or test, an *educational* one be applied, *viz:* that no child under fifteen years of age shall be employed who does not hold a certificate from the school committee of the town where he resides that he can read and write the English language." This, he says, "largely eliminates the age question, and substitutes an element that will naturally cause parents to seek a certain amount, at least, of schooling for their children.

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On the other hand, it would be difficult to establish such a standard that uniform results could be secured all over the State."

The regularity of attendance has deteriorated during 1899, the "average number belonging" being less by 1090, and the "average attendance" by 1283. This, with the large number of non-attendants, is regarded as largely due to the prevalence of childhood sicknesses and to the increasing precautions taken to prevent their spread by contagion.

There is reported also "for the first time in a number of years . . . a *decrease* in the number of *re-enrollments*." Yet, in spite of all this, the total number of schools has increased by 37,—55 new graded schools having been added, and 18 ungraded schools abolished. The school year has, for the first time in nine years, been shortened by about one week; and the total number of teachers has increased by 61, while the number of *experienced* instructors is nearly 93 per cent, —a larger proportion than has been maintained for many years.

NOTES.

Mr. John B. C. Kershaw, in an article entitled *An Investigation of the Cause of Trade Fluctuations*, in the *Economic Journal* for December, 1900 (pages 474–486), presents the theory that, as all international trade is, fundamentally, the exchange of products of agricultural labor for those of mechanical labor, the volume of trade must be dependent on the volume of crops, and a series of bad harvests must affect, in more or less exact ratio, the trade of manufactured goods. This theory, first pronounced by William Herschell, has received support from such economists as Jevons and Giffen; and Mr. Kershaw shows diagramatically that the fluctuations from 1856 to 1898 in cotton, wheat, and sugar exported from the United Kingdom and in the total crops raised in the chief producing countries, tend generally and moderately to substantiate the theory. This cause, he regards as co-existant and equally important with the "credit cycles" and tariff changes, in its effect in bringing about the periodic depressions in trade and commerce. Sufficiently influential is it, indeed, that each commodity, regarded with due allowance for "lag" effects peculiar to it, may exert, in connection with other products, or individually, an effect generally recognizable in the final trade fluctuations.

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The *Journal of the Royal Statistical Society* for September, 1900, contains (pages 459–472) an address by Major P. G. Craigie, President of Economic Science and Statistics Section of the British Association. Mr. Craigie speaks of the importance, in census work, of enumerating all the characteristic *units* of population, and, particularly in agricultural statistics, of reducing data from different places and of different times to a common standard, suitable for accurate comparison. For example, allowance should be made for the varying size of minimum "holdings" to be considered in agricultural statistics, this variation extending as it does from three acres in the United States to no limit whatever in Germany, Belgium, or Ireland. He speaks also of the chief products to be considered in such study, and emphasized the inaccuracies, in treatment of the subject of *live stock*, due to variations in the productive power of an acre. He warns statisticians against treating isolated cases and against indulging in prophecies where all conditions have not an assured permancy for the future.

In the annual report of the American Unitarian Association for 1900, statistics with diagram curves are printed, showing the growth of this denomination. In 1850 there were 251 churches; in 1900 but 199 churches of date before 1850; 52 churches, existing in 1850, have thus apparently ceased to exist in 1900; 8 churches have disappeared in the last decade. There is a total growth of churches from 251 in 1850 to 457 in 1900.

In an address delivered by Mr. T. T. Sullivan, President of the Ohio Bankers' Association, at the annual meeting of the Association, October 24, 1900, some interesting returns were presented in regard to the occupation, of the depositors of the Society for Savings in Cleveland. This savings institution has 58,300 open accounts, representing $37,000,000 of deposits. The occupations of the depositors are roughly distributed as follows: —

Professional men	1,700
Clerks	9,200
Teachers	2,600
Employees in manufactories and trade	13,500
Day laborers	9,500
Domestics	3,500
Miscellaneous unable to classify	18,300
	58,300

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In the *Eighteenth Annual Report of the Charity Organization Society of New York*, on p. 71, an analysis is made of the chief causes of need of 1460 new families considered during the year. The condensed classification appears as follows: —

Disregard of Family Ties.	Totals.	Per cent.
Desertion, neglect to contribute by children, by brothers, by sisters, or other natural supporters	121	8.28
Within the Family.		
Intemperance (abuse of stimulants or narcotics)	201	13.76
Licentiousness	17	1.15
Dishonesty, or other moral defects	28	1.92
Lack of thrift, industry, or judgment	150	10.22
Physical or mental defects. Blind, deaf, crippled from birth, insane, feeble-minded, etc	40	2.81
Sickness, accident, or death	367	25.14
Outside the Family.		
Lack of employment, not due to employee (change in trade, introduction of machinery, hard times, strike or lockout, partial or complete shutdown, removal of industry, etc.)	284	19.45
Defective sanitation	1	.07
Degrading surroundings	12	.83
Unwise philanthropy	4	.27
Unclassified	235	16.10
	1460	100.00

The New York *World Almanac and Encyclopedia* for 1901 contains, among its new articles, reviews of the area and population of the United States, commerce with the United States dependencies, the anti-imperialist party and platform, the census reports of the United States, the milk production of the United States, and European banking statistics.

Hazell's Annual (English) for 1901 contains a number of new reports on important statistical subjects. Among these may be mentioned (1) the *Report on Indian Expenditure* by the Royal Commission on India; (2) a discussion of the *Labor Movement*, with the recent legislation of Belgium, France, Germany, Spain, Switzerland, and New Zealand; (3) an article, containing four tables, on the *Coal Trade in 1900*, reprinted from the *Journal of the Iron and Steel Institute* for 1900; (4) an article on the railways of the world, of the United Kingdom, and of the British Empire during 1900; (5) the *Stock Exchange Movements* in 1900, with six tables; (6) *Trade in 1900*, given for countries and for chief articles of commerce, with five tables; also a consideration of trade-marks, trade unions, etc.; and (7) the *Wine, Spirits, and Beer Trade of the United Kingdom*, with two tables.

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The *Tribune Almanac and Political Register* for 1901 (Vol. XIII, No. 1) contains an historical table, giving the total values of imports and exports in merchandise and specie, for the United States, from 1790 to 1900.

STATISTICS OF HOUSING ACCOMMODATION.

The following article is reprinted from *Public Health* (London, January, 1901), based upon a report published in *Revue d'Hygiène:* —

In the demographical section of the recent International Congress of Hygiene and Demography, held at Paris last August, M. A. Fontaine submitted a communication dealing with the question of the housing of populations according to the number of rooms in each tenement or house, the figures being extracted from census returns and other sources. He submitted a table dealing with the condition prevailing in fourteen large European and four American towns and cities. It appeared that the percentages of inhabitants dwelling in tenements occupied by two or more persons per room were: —

Paris,	6	Lemberg,	37	Salzburg,	9
Berlin,	8	Brünn,	14	Innspruck,	2
Dresden,	9	Cracow,	33	Marburg,	18
Vienna,	13	Pilsen,	43	St. Petersburg,	35
Prague (including suburbs),	27	Reichenburg,	39	Moscow,	28

M. Fontaine hesitated to accept the higher ratios mentioned, and while thinking that industrial and national customs had some share in producing these conditions, thought that it was desirable for future inquiries to formulate more accurate definitions of the fundamental terms of the inquiry. He held that information was required as to the cubic capacity of the rooms which formed the subject of any such inquiry, but thought that such information could be obtained only in the course of ordinary sanitary supervision. After discussion, the following definitions were agreed upon: —

Room.— Every sub-division of a house intended for habitation separated from other sub-divisions by partitions reaching to the ceiling and capable of accommodating a bed for an adult.

Tenement.— The aggregation of rooms intended for occupation by persons living within one front door (*vivant sous une même clef*). The rooms appurtenant to the tenement, and occupied by the domes-

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tics of the family (frequently in another part of the house on the Continent), are to be included. Water-closets should not be included in the number of rooms, nor should stables, coach-houses, shops, studios, etc., except such as may be used for habitation.

It was also resolved that returns should be made of the number of rooms included in and of persons inhabiting each tenement; and that data should be included for determining the number of persons inhabiting each room. The returns should be published in the following form: —

Number of rooms per tenement.	Number of Persons Per Tenement.											Total number of tenements of each class of —— rooms.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11 and Over.	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11 and over												
Total number of tenements occupied by —— persons.....												

Schools, barracks, hospitals, penitentiaries, etc., should be made the subject of separate returns.

On the motion of M. de Inana-Sternegg, it was further resolved that for the purposes of a summary return it would suffice to state the number of rooms in each tenement, with some indications as to the variations in size and the uses of the rooms, and the number of inhabitants of each tenement. For more minute inquiries (usually limited to smaller areas) it was requisite to specify the size and use of each room, means of warming, etc. This plan was, he thought, preferable to any definition of the terms "room," "tenement," etc. The Congress expressed the hope that local sanitary authorities would establish registers of tenements, giving particulars of each room.

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INACCURACY OF TRADE STATISTICS.

At a meeting of this Association of Chambers of Commerce of the United Kingdom, held in Paris, September 5, 1900, the following resolution was proposed by A. Serena (Italian Chamber, London): —

"That the Board of Trade statistics of imports, classified according to the several exporting countries, are inaccurate as regards articles not imported directly by sea into the United Kingdom; and that it is desirable to make representations on this subject to the Board of Trade."

He said the Italian Chamber of Commerce in London wished to bring to the notice of the Associated Chambers of Commerce the remarkable discrepancy between the statistics of Italian imports into the United Kingdom, published by the Board of Trade, and the statistics of exports from Italy to the United Kingdom, published by the Italian Minister of Agriculture and Commerce. The commodities specially alluded to were butter, eggs, and cheese, for which he would give the figures for the four years 1895–1898. For convenience of comparison the Italians returns, as regarded butter and cheese, had been converted from quintals to hundred weights, and the figures for eggs had been reduced from quintals to great hundreds, on the basis of 4½ lbs. to the great hundred. In 1895 the Board of Trade gave the returns for butter as 496 cwts., whereas, according to the Italian statistics, it should be 35,460 cwts. In 1896 the English figures were 1359 cwts., the Italian figures for the same period being 38,414 cwts. In 1897 the English returns gave 1349 cwts., but the Italian figure was 31,540 cwts.; while in 1898 they were 293 cwts. English, as against 32,839 cwts. Italian. In eggs the Board of Trade return for 1895 was 1070 great hundreds, whereas the Italian returns gave 1,632,282 great hundreds. In 1896 English returns gave 622 great hundreds, and the Italian 1,481,255 great hundreds. The English figures for 1897 were 19,530 great hundreds; Italian, 1,383,716; 1898 — English returns, 1672; Italian, 1,510,348 great hundreds. The same discrepancies occurred in cheese. In 1895 the Board of Trade gave the quantity as 794 cwts., whereas the Italians gave 49,117 cwts. In 1896 the English gave 1328 cwts., and the Italians, 42,747. In 1897 the Board of Trade gave 946 cwts., whereas the Italians stated the quantity as 43,000 cwts. The 1898 figures given

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by the Board of Trade for cheese were 556 cwts., whereas the Italians gave 48,125 cwts. From inquiries made it was clear that the megreness of the Board of Trade returns was due to the circumstance that butter, eggs, and cheese were exported overland to French, Belgian, Dutch, and German ports, and thence by sea to the United Kingdom, and were entered in the custom house returns as French, Belgian, Dutch, or German imports, despite the fact that, in compliance with the Merchandise Act, they were clearly described on the covering as Italian produce. It was therefore very evident that the English statistics of imports from Italy were absolutely misleading regarding commodities sent overland, and that they must necessarily give a very inadequate expression of the importance of the trade carried on between the two countries, and conveyed a correspondingly exaggerated picture of the volume of trade between the United Kingdom and certain other countries.

The matter had been brought before the Board of Trade, which body admitted that their figures only covered consignments direct by ship from Italy, and stated that the same principle was applied generally through the British import returns, and that any attempts to classify such imports according to the country of production would lead to annoying restrictions. His, Mr. Serena's chamber, thought the reply received was far from satisfactory, and was most inconclusive. They considered the matter of sufficient importance to justify them in submitting it to the meeting. They suggested that before publishing their statistics the Board of Trade should submit them to the various countries interested for comparison and approval, and that in any case they should specify that their figures represented direct shipments by sea only, and that they were unable to classify the consignments sent overland. No doubt, now the subject had been ventilated, other suggestions would be forthcomming, and he would conclude by formally moving the resolution which he had read.

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OF THE

AMERICAN STATISTICAL ASSOCIATION.

ARTICLE I. This Association shall be denominated the AMERICAN STATISTICAL ASSOCIATION.

ART. II. The objects of the Association shall be to collect, preserve, and diffuse statistical information in the different departments of human knowledge.

ART. III. The Association shall be composed of Fellows and Honorary Members.

ART. IV. All members shall be chosen by the Board of Directors, the affirmative votes of four-fifths of the members of said Board being necessary to a choice. Each fellow shall pay annually two dollars or twenty dollars at some one time.

ART. V. Fellows only shall be entitled to vote, but Honorary Members shall have the right to sit and deliberate in all the meetings of the Association.

ART. VI. The officers of the Association shall be a President, five Vice-Presidents, a Recording Secretary, a Corresponding Secretary, a Treasurer, a Librarian, and three Counselors, who, together with the President and Secretaries, shall form a Board of Directors for the government of the institution, three of whom shall constitute a quorum at any meeting regularly convened. There shall be also three Standing Committees of three members each, namely, on Publication, on Finance, and on the Library.

ART. VII. The Association shall meet in the city of Boston, on the third Friday in January, April, and October, and at such other times as the Board of Directors shall appoint. At the annual meeting in January, the Association shall hear reports of the Board of Directors, of the Treasurer, of the Librarian, and of the Standing Committees, elect officers, and transact other business. Vacancies may be filled at any regular meeting. Five members shall be necessary to form a quorum for transacting business and the election of members, but a less number may adjourn the meeting.

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I. INDUSTRIAL CONSOLIDATIONS IN THE UNITED STATES. By Luther Conant, Jr.
II. THE ENUMERATION OF CHILDREN. By Allyn A. Young.
III. MISCELLANY AND NOTICES: Functional Health of Women, *Mary Roberts Smith;* Monthly Bulletin of the Statistics Department of Boston, *E. H. D.;* Economic Statistics, *E. H. D.;* Statistics of Pauperism; The Ratio of Physicians to the Population.

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CONTENTS.

I. Industrial Consolidations in the United States. *By Luther Conant, Jr.* 207

II. The Enumeration of Children. *By Allyn A. Young.* 227

III. Miscellany and Notices: —

Functional Health of Women. *Mary Roberts Smith.* . 255

Monthly Bulletin of the Statistics Department of Boston. *E. H. D.* 259

Economic Statistics. *E. H. D.* 262

Statistics of Pauperism. 264

The Ratio of Physicians to the Population. 266

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AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, No. 53. MARCH, 1901.

INDUSTRIAL CONSOLIDATIONS IN THE UNITED STATES.

BY LUTHER CONANT, JR., S.B.,

EDITOR "INDUSTRIAL SECURITIES," "THE JOURNAL OF COMMERCE AND COMMERCIAL BULLETIN," N. Y.

It is hardly neccessary to say that in the preparation of this brief article upon consolidations in the United States there is no intention of introducing into these publications any argument either in favor of or against the so-called trusts. On the contrary, it is attempted merely to present in condensed form, as an intelligent basis for investigation, some elementary data of the "consolidation movement," particularly its proportions from year to year, and roughly its relations to general conditions with a view to suggesting a few of the chief causes and influences bearing upon it. For this purpose the following compilation has been prepared, showing in detail and also in chronological order the organization of industrial consolidations in the United States. The term "industrial" is used in its narrower Wall Street sense, to the exclusion of the large number of consolidations formed in the railway world, street railways, gas and electric lighting and similar fields. Only companies having a capitalization of $1,000,000 or more have been considered. The figures given are of authorized and not issued capitalization, as the

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latter is much the more subject to change. Division is made into preferred stock, common stock and bonds, the last named including debentures, where such have been employed. As one of the chief features of the table is its comparison year by year, the original capital of the respective companies has in nearly every case been given, indicating subsequent increases later, as such increases obviously should be considered as a part of the total capitalization in the years when made; reductions in authorized capitalization have also been indicated.

It may be said that in most cases the issued capitalization of the companies given does not vary widely from the amounts authorized. Among the conspicuous exceptions are the Illinois Steel Company, which issued only about $18,000,000 of its $50,000,000 capital stock; the Federal Steel Company, which retains about half its $200,000,000 of stock in its Treasury; the American Brass Company, which has issued but $8,000,000 of its $20,000,000 authorized stock; the Distilling Company of America, the issued stocks of which amount to roughly $77,000,000 against an authorized total of $125,000,000; and the Rubber Goods Manufacturing Company, which has unissued in its Treasury about one half its $50,000,000 capital. Following is the list in detail:—

Year when Incorporated.	Authorized Capitalization.		
	Stock.		
Previous to 1887.	*Preferred.*	*Common.*	*Bonds.*
American Screw Co., 1860 . .	$ . . .	$3,250,000	$ . . .
d Standard Oil Trust, 1872 . .	. . .	97,250,000	. . .
x Westinghouse Electric & Mfg. Co., 1872	4,000,000	6,000,000	. . .
x Union Switch & Signal Co., 1882	500,000	1,000,000	500,000
d American Cotton Oil Trust, 1884	. . .	40,000,000	. . .
d National Linseed Oil Trust, 1885	. . .	18,000,000	. . .
Total . .	$4,500,000	$165,500,000	$500,000

FOOTNOTE.— The sign *x* indicates that the capitalization was increased later, *z* that it was reduced; *d* denotes that the item is duplicated later in the list (see appendix); *r* denotes that company was reorganized; *b* indicates 1st and 2d preferred stock, *u* underlying bonds, *y* part underlying bonds and part direct issues.

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Year when Incorporated.	Authorized Capitalization. *Stock.*		
	Preferred.	*Common.*	*Bonds.*
1887.			
z Southern Cotton Oil Co.	$ . . .	$5,000,000	$ . . .
xd National Cordage Co.	5,000,000	10,000,000	. . .
zd National Lead Trust	. . .	90,000,000	. . .
Pacific Coast Borax Co.	1,000,000	1,500,000	. . .
d Sugar Refineries, The (trust)	. . .	50,000,000	. . .
Safety Car Heating and Lighting Co.	. . .	5,000,000	. . .
rd National Linseed Oil Co.	. . .	18,000,000	. . .
d Distilling & Cattle Feeding Trust	. . .	30,726,000	. . .
Total, 1887	$6,000,000	$210,226,000	
1888.			
x Electric Storage Battery Co.	$5,000,000	$8,500,000	$450,000
New York Breweries Co.	1,500,000	1,500,000	1,650,000
Tidewater Oil Co.	. . .	5,000,000	. . .
Total, 1888	$6,500,000	$15,000,000	$2,100,000
1889.			
American Cotton Oil Co.	$15,000,000	$20,237,100	$5,000,000
" Axe & Tool Co.,	. . .	3,872,500	. . .
x Diamond Match Co.	. . .	7,500,000	. . .
d Illinois Steel Co.	. . .	50,000,000	13,200,000
Indianapolis Breweries Ltd.	665,000	665,000	800,000
American Pipe Mfg. Co.	. . .	1,000,000	. . .
Chicago Breweries Ltd.	. . .	3,000,000	2,000,000
z Consolidated Car Heating and Lighting Co.	. . .	2,500,000	. . .
Denver United Breweries Co.	1,000,000	1,000,000	1,000,000
Western Stone Co.	. . .	2,000,000	500,000
American Strawboard Co.	. . .	6,000,000	1,250,000
St. Louis Breweries Ltd.	4,500,000	4,500,000	5,000,000
Total, 1889	$21,155,000	$102,274,600	$28,750,000
1890.			
[1]*d* American Biscuit & Mfg. Co.	$ . . .	$9,000,000	*a* $545,000
" Book Co.	. . .	5,000,000	. . .
x " Tobacco Co.	14,000,000	15,000,000	. . .
" Mfg. Co. (bagging)	. . .	3,111,500	. . .
" Shot & Lead Co.	. . .	3,000,000	. . .

a, Amount issued; 1, incorporation of these companies was not confirmed.

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Year when Incorporated.	Authorized Capitalization. *Stock.*		
	Preferred.	*Common.*	*Bonds.*
1890.—*Continued.*			
Celluloid Co.	$ . . .	$6,000,000	$ . . .
•Chicago Junction Railways and Union Stock Yards . . .	6,500,000	5,500,000	13,000,000
rd Distilling & Cattle Feeding Co.	. . .	35,000,000	. . .
•*rd* National Starch Mfg. Co. .	*b* 5,500,000	5,000,000	4,500,000
r " Harrow Co. . .	. . .	2,000,000	. . .
d New York Biscuit Co. . .	. . .	10,000,000	1,500,000
r United States Book Co. . .	2,000,000	2,000,000	1,000,000
d United States Baking Co. .	. . .	5,000,000	. . .
Total, 1890, . .	$28,000,000	$106,611,500	$20,545,000
1891.			
American Cereal Co. . . .	$ . . .	$3,400,000	$1,550,000
•*x* " Sugar Refining Co. .	25,000,000	25,000,000	. . .
z " Lithographic Co. . .	3,500,000	8,500,000	. . .
" Wringer Co. . . .	350,000	1,650,000	. . .
" Soda Fountain Co. .	*b* 2,500,000	1,250,000	. . .
" Steel Casting Co. . .	1,350,000	2,850,000	. . .
r Atlas Tack Co.	. . .	700,000	300,000
d Consolidated Steel and Wire Co.	. . .	4,000,000	. . .
International Elevating Co. . .	. . .	2,200,000	. . .
x National Casket Co. . . .	. . .	3,000,000	. . .
d " Tube Works Co. . .	5,750,000	5,750,000	. . .
" Lead Co., . . .	15,000,000	15,000,000	. . .
z " Rice Milling Co. . .	2,000,000	3,000,000	. . .
United States Glass Co. . .	. . .	5,000,000	. . .
" " Printing Co. . .	. . .	3,500,000	. . .
Yellow Pine Co. , . . .	900,000	1,200,000	. . .
Pittsburg Plate Glass Co. . .	150,000	9,850,000	. . .
Total . .	$56,500,000	$95,850,000	$1,850,000
x American Tobacco Co. (increase)	. . .	6,000,000	. . .
d National Cordage Co. "	. . .	. . .	6,000,000
Grand total, 1891 . .	$56,500,000	$101,850,000	$7,850,000
1892.			
z American Typefounders Co. .	$4,000,000	$5,000,000	$ . . .
•*x* Colorado Fuel & Iron Co. . .	2,000,000	11,000,000	6,500,000
z General Electric Co. . . .	4,252,000	30,460,000	. . .
rd Hecker-Jones-Jewell Milling Co.	3,000,000	2,000,000	2,500,000
•*rd* Herring-Hall-Marvin Co. . .	1,500,000	1,800,000	. . .

3, Company dissolved owing to failure of reorganization plan.

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Year when Incorporated.	Authorized Capitalization. *Stock.*		
	Preferred.	*Common.*	*Bonds.*
1892.—*Continued.*			
d Michigan Peninsular Car Co.	$5,000,000	$3,000,000	$2,000,000
c National Wall Paper Co.	. . .	30,000,000	. . .
New York Wire Cloth Co.	400,000	600,000	. . .
Trenton Potteries Co.	1,250,000	1,750,000	. . .
United States Rubber Co.	25,000,000	25,000,000	. . .
Total	$46,402,000	$110,610,000	$11,000,000
American Sugar Refining Co. (increase)	12,500,000	12,500,000	. . .
Western Stone Co. (increase)	. . .	250,000	150,000
Grand Total, 1892	$58,902,000	$123,360,000	$11,150,000
1893.			
International Pulp Co.	$2,000,000	$3,000,000	$ . . .
Lake Superior Consolidated Iron Mines	. . .	30,000,000	. . .
d Manhattan Spirit Co.	. . .	5,000,000	. . .
rd United States Cordage Co.	14,000,000	20,000,000	7,500,000
United States Leather Co.	64,000,000	64,000,000	10,000,000
Union Typewriter Co.	*b* 8,015,000	10,000,000	. . .
	$88,015,000	$132,000,000	$17,500,000
x Diamond Match Co. (increase)	. . .	1,500,000	. . .
Total, 1893,	$88,015,000	$133,500,000	$17,500,000
1894.			
d Carnegie Steel Co., Ltd.	$ . . .	$25,000,000	$ . . .
x American Glue Co.	1,000,000	1,400,000	. . .
d National Linseed Oil Co. (increase)	. . .	. . .	3,000,000
Total, 1894,	$1,000,000	$26,400,000	$3,000,000
1895.			
d American Spirits Mfg. Co.	$7,000,000	$28,000,000	$2,000,000
d Consolidated Ice Co.	3,500,000	6,500,000	*u* 1,255,000
r Brooklyn Wharf & Warehouse Co.	*b* 7,500,000	5,000,000	17,500,000
r Pennsylvania Steel Co.	1,500,000	5,000,000	7,000,000
x Virginia Carolina Chemical Co.	2,500,000	4,000,000	. . .
d Welsbach Commercial Co.	3,500,000	3,500,000	. . .
x Diamond Match Co. (increase)	. . .	2,000,000	. . .
Total, 1895,	$25,500,000	$54,000,000	$27,755,000

c, Company dissolved in 1900. The original capital was only $14,000,000 but no record of the dates of increase obtained.

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Year when Incorporated.	Authorized Capitalization. Stock.		
1896.	*Preferred.*	*Common.*	*Bonds.*
American Electric Heating Corporation.	$ . . .	$10,000,000	$500,000
Central Fireworks Co.	1,750,000	1,750,000	. . .
x Pure Oil Co.	. . .	1,000,000	. . .
d Spirits Distributing Co.	*b* 3,675,000	3,675,000	. . .
Standard Rope & Twine Co.	. . .	12,000,000	10,500,000
Westinghouse Electric & Mfg. Co. (increase)	. . .	5,000,000	. . .
Total, 1896,	$5,425,000	$33,425,000	$11,000,000
1897.			
x American Malting Co.	$15,000,000	$15,000,000	$ . . .
r " Wood Working Machinery Co.	2,000,000	2,000,000	2,000,000
Glucose Sugar Refining Co.	14,000,000	26,000,000	. . .
dx Shelby Tube Co.	. . .	5,000,000	. . .
Total, 1897,	$31,000,000	$48,000,000	$2,000,000
1898.			
American Linseed Co.	$16,750,000	$16,750,000	$ . . .
dr " Fisheries Co.	2,000,000	8,000,000	. . .
d " Steel & Wire Co. of Ill.	12,000,000	12,000,000	. . .
" Tin Plate Co.	20,000,000	30,000,000	. . .
" Thread Co.	6,000,000	6,000,000	6,000,000
d Atlantic Snuff Co.	. . .	10,000,000	. . .
Cleveland & Sandusky Brewing Co.	3,000,000	3,000,000	6,000,000
x Continental Tobacco Co.	37,500,000	37,500,000	. . .
Federal Steel Co.	100,000,000	100,000,000	*u* 26,600,000
International Paper Co.	25,000,000	20,000,000	10,000,000
" Silver Co.	9,000,000	11,000,000	4,500,000
Knickerbocker Ice Co. (Chicago)	3,000,000	4,000,000	2,000,000
Maryland Brewing Co.	3,250,000	3,250,000	7,500,000
r National Shear Co.	1,500,000	1,500,000	. . .
" Biscuit Co.	25,000,000	30,000,000	*u* 1,800,000
d Standard Distilling & Distributing Co.	8,000,000	16,000,000	. . .
d Union Tobacco Co.	12,000,000	12,000,000	. . .
United States Envelope Co.	3,750,000	1,000,000	2,000,000
United Breweries Co. (Chicago)	. . .	5,600,000	3,500,000
Otis Elevator Co.	4,500,000	6,500,000	. . .
	$289,250,000	$334,100,000	$69,900,000

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Year when Incorporated.	Authorized Capitalization. Stock.		
1898.—*Continued.*	*Preferred.*	*Common.*	*Bonds.*
INCREASES			
Union Switch & Signal Co. . .	$ . . .	$ . . .	$500,000
United States Rubber Co. . .	. . .	. . .	*u* 5,000,000
Virginia-Carolina Chemical Co. .	. . .	*k* 5,500,000	. . .
Westinghouse Electric & Mfg. Co.	. . .	. . .	*y* 4,350,000
Grand Total, 1898, . .	$289,250,000	$339,600,000	$79,750,000
1899.			
Alabama & Georgia Consolidated Coal & Iron Co.	$650,000	$650,000	$ . . .
d American Saddle Co. . . .	800,000	1,000,000	. . .
" School Furniture Co. .	5,000,000	5,000,000	. . .
" Brass Co. . . .	. . .	20,000,000	. . .
" Steel and Wire Co. .	40,000,000	50,000,000	. . .
" Radiator Co. . .	5,000,000	5,000,000	. . .
" Car & Foundry Co. .	30,000,000	30,000.000	. . .
" Ice Co.	30,000,000	30,000,000	. . .
" Woolen Co. . .	25,000,000	40,000,000	. . .
" Felt Co. . . .	2,500,000	2,500,000	500,000
" Shipbuilding Co. .	15,000,000	15,000,000	. . .
" Beet Sugar Co. . .	5,000,000	15,000,000	. . .
Amalgamated Copper Co. . .	. . .	75,000,000	. . .
American Steel Hoop Co. . .	14,000,000	19,000,000	. . .
" Smelting & Refining Co.	32,500,000	32,500,000	. . .
" Bicycle Co. . . .	10.000,000	20,000,000	20,000,000
" Hide & Leather Co. .	17,500,000	17,500,000	10,000,000
" Agricultural Chemical Co.	20,000,000	20,000,000	. . .
d Asphalt Company of America .	. . .	30,000,000	$ 30,000,000
Atlantic Clay Co.	1,000,000	2,000,000	. . .
American Grass Twine Co. . .	. . .	15,000,000	. . .
" Pastry & Mfg. Co. . .	1,000,000	2,000,000	. . .
" Writing Paper Co. .	12,500,000	12,000,000	17,000,000
" Chicle Co. . . .	3,000,000	6,000,000	. . .
" Pneumatic Service Co. .	5,000,000	10,000,000	. . .
Alabama Cons. Coal & Iron Co. .	2,500,000	2,500,000	. . .
American Iron & Steel Co. . .	3,000,000	17,000,000	. . .
" Cement Co. . . .	. . .	2,100,000	1,000,000
" Window Glass Co. . .	4,000,000	13,000,000	. . .
Baltimore Brick Co. . . .	900,000	1,200,000	1,500,000
d Columbia Electric Car Lighting & Brake Co.	. . .	10,000,000	. . .

k, Common and preferred.
$, Trust certificates issued against stock held in trust.

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Year when Incorporated.	Authorized Capitalization. *Stock.*		
1899.—*Continued.*	*Preferred.*	*Common.*	*Bonds.*
Consolidated Rubber Tire Co.	$5,000,000	$5,000,000	$ . . .
California Fruit Packers' Association	. . .	2,500,000	. . .
Consolidated Lake Superior Co.	6,000,000	14,000,000	. . .
Continental Cotton Oil Co.	3,000,000	3,000,000	. . .
Central Foundry Co.	7,000,000	7,000,000	4,000,000
4Distilling Company of America	55,000,000	70,000,000	*u* 1,899,000
Empire Steel & Iron Co.	2,500,000	2,500,000	. . .
Electric Boat Co.	5,000,000	5,000,000	. . .
General Chemical Co.	12,500,000	12,500,000	. . .
Great Lakes Towing Co.	2,500,000	2,500,000	. . .
General Aristo Co.	2,500,000	2,500,000	. . .
Havana Commercial Co.	7,500,000	12,500,000	. . .
Havana-American Co.	3,000,000	7,000,000	. . .
International Power Co.	600,000	7,400,000	. . .
" Steam Pump Co.	12,500,000	15,000,000	. . .
" Car Wheel Co.	5,000,000	10,000,000	. . .
" Automobile & Vehicle Tire Co.	1,500,000	1,500,000	. . .
d Kentucky Distilleries & Warehouse Co.	12,000,000	20,000,000	. . .
Keystone Watch Case Co.	2,200,000	1,100,000	. . .
Monongahela River Consolidated Coal & Coke Co.	10,000,000	20,000,000	10,000,000
Mt. Vernon Woodbury Cotton Duck Co.	. . .	9,500,000	14,000,000
National Carbon Co.	4,500,000	5,500,000	. . .
National Enameling & Stamping Co.	10,000,000	20,000,000	. . .
" Steel Co.	27,000,000	32,000,000	*u*2,561,000
" Salt Co.	5,000,000	7,000,000	. . .
" Tube Co.	40,000,000	40,000,000	. . .
" Glass Co.	. . .	4,000,000	2,000,000
New England Cotton Yarn Co.	6,500,000	5,000,000	5,700,000
Niles-Bement-Pond Co.	3,000,000	5,000,000	. . .
Pressed Steel Car Co.	12,500,000	12,500,000	. . .
Pacific American Fisheries Co.	. . .	5,000,000	. . .
" Coast Biscuit Co.	1,500,000	2,500,000	1,500,000
e Pullman Co.	. . .	74,000,000	. . .
Paterson Brewing & Malting Co.	. . .	3,000,000	. . .
Pittsburg Stove & Range Co.	1,000,000	1,000,000	. . .
Pittsburg Coal Co.	32,000,000	32,000,000	. . .

4, This Company in 1901 issued $4,000,000 more bonds.
e, Date of consolidation with Wagner Co.

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Year when Incorporated.	Authorized Capitalization. *Stock.*		
1899.—*Continued.*	*Preferred.*	*Common.*	*Bonds.*
Pittsburg Brewing Co.	$6,500,000	$6,500,000	$6,500,000
Rubber Goods Manufacturing Co.	25,000,000	25,000,000	. . .
Royal Baking Powder Co.	10,000,000	10,000,000	. . .
Republic Iron & Steel Co.	25,000,000	30,000,000	. . .
Rochester Optical & Camera Co.	. . .	3,500,000	. . .
Seacoast Packing Co.	3,000,000	5,000,000	. . .
Standard Sanitary Mfg. Co.	2,500,000	2,500,000	2,500,000
" Phosphate & Fertilizer Co.	400,000	600,000	. . .
Sloss-Sheffield Steel & Iron Co.	10,000,000	10,000,000	*u* 3,835,000
Springfield (Mass.) Breweries Co.	1,150,000	1,150,000	1,150,000
Standard Shoe Machinery Co.	2,000,000	3,000,000	. . .
Union Bag & Paper Co.	11,000,000	16,000,000	. . .
U. S. Cast Iron Pipe & Foundry Co.	15,000,000	15,000,000	. . .
United Fruit Co.	. . .	20,000,000	. . .
rd United States Flour Milling Co.	12,500,000	12,500,000	15,000,000
d United Starch Co.	2,500,000	3,500,000	. . .
United Shoe Machinery Co.	12,500,000	12,500,000	. . .
United States Finishing Co.	2,000,000	1,000,000	1,750,000
" " Bobbin & Shuttle Co.	950,000	1,050,000	. . .
Virginia Iron, Coal & Coke Co.	. . .	10,000,000	10,000,000
Total	$726,150,000	$1,188,750,000	$162,395,000
[6] Deduct duplicates	12,800,000	21,000,000	. . .
Net Total	$713,350,000	$1,167,750,000	$162,395,000
INCREASES.			
American Tobacco Co.	$ . . .	$35,000,000	$ . . .
" Malting Co.	. . .	. . .	5,000,000
Continental Tobacco Co.	12,500,000	12,500,000	. . .
Colorado Fuel & Iron Co.	. . .	12,000,000	. . .
Diamond Match Co.	. . .	4,000,000	. . .
Electric Storage Battery Co.	. . .	4,500,000	. . .
National Casket Co.	. . .	3,000,000	. . .
Standard Oil Co. of N. J.	. . .	100,000,000	. . .
Virginia-Carolina Chemical Co.	6,000,000	6,000,000	. . .
Total increases	$18,500,000	$177,000,000	$5,000,000
Grand Total, 1899	$731,850,000	$1,344,750,000	$167,395,000

6 This deduction is made here because in this year the American Saddle Co. was absorbed by the American Bicycle Co., and the Kentucky Distilleries & Warehouse Co. by the Distilling Co. of America.

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Year when Incorporated.	Authorized Capitalization. *Stock.*		
1900.	*Preferred.*	*Common.*	*Bonds.*
e American Caramel Co. . .	$1,000,000	$1,000,000	$600,000
" Bridge Co. . . .	35,000,000	35,000,000	. . .
" Sheet Steel Co. . .	26,000,000	26,000,000	. . .
" Clay Manufacturing Co.	. . .	10,000,000	2,500,000
" Loom Co. . . .	. . .	1,000,000	. . .
" Snuff Co. . . .	12,500,000	12,500,000	. . .
" Sash & Door Co. .	2,500,000	3,500,000	. . .
" Rice Growers' Distributive Co.	1,000,000	14,000,000	. . .
Buffalo Union Furnace Co. . .	200,000	1,000,000	300,000
Carnegie Company . . .	. . .	160,000,000	160,000,000
Crucible Steel Company of America.	25,000,000	25,000,000	. . .
Consolidated Railway Electric Car Lighting & Equipment Co. . .	. . .	16,000,000	. . .
Consolidated Lime Co. . . .	1,500,000	1,500,000	. . .
Continental Gin Co. . . .	. . .	3,000,000	. . .
Compressed Air Co. . . .	755,000	7,245,000	500,000
Delta Cotton Oil Co. . . .	. . .	1,000,000	. . .
Fisheries Co.	2,000,000	1,000,000	500,000
Flint, Eddy & American Trading Co.	2,000,000	2,000,000	. . .
Herring-Hall-Marvin Co. . .	*b* 1,650,000	1,650,000	. . .
Illinois Brick Co.	4,000,000	5,000,000	. . .
International Fire Engine Co. .	4,000,000	5,000,000	. . .
g " Crude Rubber Co. .	10,000,000	20,000,000	. . .
" Emery & Corundum Co.	. . .	2,000,000	500,000
Jones & Laughlins	. . .	20,000,000	. . .
Magnus Metal Co.	1,500,000	1,500,000	. . .
National Sugar Refining Co. . .	10,000,000	10,000,000	. . .
" Asphalt Co. . . .	10,000,000	12,000,000	6,000,000
" Starch Co. . . .	4,500,000	5,000,000	8,000,000
New England Brick Co. . .	3,000,000	2,000,000	850,000
National Roofing & Corrugating Co.	. . .	5,000,000	. . .
" Leather Co. . . .	. . .	5,000,000	. . .
" Fish Co.	. . .	5,000,000	. . .
New York & Kentucky Co. . .	1,000,000	1,000,000	. . .
Pittsburg Valve, Foundry & Construction Co.	. . .	1,100,000	. . .
Pratt & Whitney Co. . . .	1,225,000	1,525,000	. . .
Rocky Mountain Paper Co. . .	600,000	750,000	. . .

e, Date of consolidation, not of incorporation; *g*, company incorporated, organization pending.

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Year when Incorporated.	Authorized Capitalization.		
	Stock.		
1900.—*Continued.*	*Preferred.*	*Common.*	*Bonds.*
Standard Milling Co. . . .	$6,900,000	$4,600,000	$5,750,000
" Chain Co. . . .	1,500,000	1,500,000	700,000
Shelby Steel Tube Co. . . .	6,000,000	9,000,000	. . .
United Metals Selling Co. . .	. . .	5,000,000	. . .
Union Talc Co.	. . .	1,000,000	600,000
Welsbach Co.	. . .	3,500,000	7,000,000
Total . . .	$175,330,000	$448,870,000	$193,800,000
Pure Oil Co. (increase) . .	2,000,000	7,000,000	. . .
General Electric Co. (increase) .	. . .	4,415,000	. . .
Grand Total, 1900, . .	$177,330,000	$460,285,000	$193,800,000
Total Entire Period. . .	$1,530,927,000	$3,264,782,100	$573,095,000
Duplicates and Reductions . .	117,025,800	719,635,600	89,000,000
Grand Net Total, .	$1,413,901,200	$2,545,146,500	$484,095,000

The following summary shows the total capitalization year by year, together with the average capitalization per company for each year and for the entire period. In arriving at the per company capitalization, duplicates have been included and increases and reductions in capital excluded. This will be found entirely proper. For instance, the National Lead Trust in reorganization reduced its capital from $90,000,000 to $30,000,000. The new company should of course be included in any compilation intended to show the average capitalization for that year, while the reduction should not be allowed for but considered in the final net total. There is perhaps some inaccuracy in including in the total capitalization for a given year companies which are merely reorganizations of others previously appearing in the list, but as the capitalization is frequently changed in reorganization, it has been deemed best in the interest of clearness to take no notice of such duplication in any one year, but to deduct it from the total for the entire period. But when a complete duplication appears in any one year, as in 1899 when the Kentucky

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Distilleries & Warehouse Company and the American Saddle Company were organized and later consolidated into larger companies in the same year, duplication has been allowed for in that year.

Year.	Number Companies.	Total Capitalization, Stock and Bonds.	*i* Average Capitalization Per Company.
1887	8	$216,226,000	$27,025,000
1888	3	23,600,000	7,867,000
1889	12	152,179,600	12,682,900
1890	13	155,156,500	11,935,000
1891	17	166,200,000	9,070,000
1892	10	193,412,000	16,800,000
1893	6	239,015,000	39,586,000
1894	2	30,400,000	13,700,000
1895	6	107,255,000	17,542,000
1896	5	49,850,000	8,970,000
1897	4	81,000,000	20,250,000
1898	20	708,600,000	34,662,000
1899	87	2,243,995,000	23,877,000
1900	42	831,415,000	19,500,000
Total.....	235	$5,198,304,100	*h* 20,900,000
Previous to 1887		170,500,000	
Grand total for all years..... .		$5,368,804,100	
Deduct reductions and duplications.....		925,661,400	
Grand net total entire period...		$4,443,142,700	

h Average for 14 years.
i The apparent discrepancy in these figures is explained above.

These comparisons are presented more forcibly in the accompanying charts.

A glance at the chart (No. 1) shows at once that the year 1899 was an extremely abnormal one in the consolidation movement. The movement in that year, in fact developed into a craze on the part of greedy promotors and vendors to unload properties upon the public at enormous prices. The figures for 1899, moreover, huge as they are, do not fully measure the proportions of industrial consolidation in that year. In addition to the companies shown, other projects amounting roughly in proposed capitalization to over one

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billion dollars were undertaken and carried to advanced stages, later, however, to be abandoned.

Dismissing the year 1899 for the moment and turning to the earlier years covered by the tables, it will be seen that for the first seven years there was little special feature to the consolidation movement, except in 1888, when it suffered a sharp check, probably owing to the fact that the presidential election occurred in that year, exercising a deterring influence upon such ventures. This cause did not apparently have much effect in 1892, a circumstance which may perhaps be accounted for in part by the general overconfidence that President Harrison would be re-elected, thus ensuring a continuance of the same administration policy that had prevailed the previous four years. In 1894 there were almost no consolidations formed, the organization of the Carnegie Steel Company Ltd., being hardly entitled to inclusion in the list. For this the panic of 1893 may be held directly accountable. At a time when payments in Wall Street were made in Clearing House certificates instead of in cash, it would have been worse than ridiculous for a promoter to ask a banker to finance an "industrial proposition," the more so because in the minds of some the failure of the notorious Cordage "Trust" was regarded as one of the acute factors which precipitated that panic. It may be asked why this effect was not shown in 1893. The answer is that most of the consolidations of 1893 were formed before the panic. It should, moreover, be borne in mind that the organization of a large consolidation is not the work of a day, but that its incorporation usually follows months of preliminary work, so that the key to the movement in any given year, as shown by the figures, may often be found in the conditions prevailing in the preceding year.

Coming down to the year 1895, the table shows that the consolidation movement recovered somewhat from the check received in 1893, but in 1896 it was again interrupted, owing

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no doubt, to the scare over Bryanism and free silver, attending the presidential election in that year. The small total in 1897 is probably due to the fact that conditions in 1896 did not favor the initiation of consolidation projects. In 1898, however, the movement made an abnormal advance, which, as already seen, become phenomenal in 1899. The sharp decline in 1900 was largely in the nature of a reaction from the excess to which the movement had been carried in the previous year. The stock market was so overloaded with new industrial securities in 1899 that promoters found great difficulty in the latter part of that year and in 1900 in inducing either bankers or the public to take up new flotations. The recurrence of another presidential election may also be again credited as a factor, but the chief influence was the difficulty in securing financial assistance for such schemes.

It would be interesting if some definite connection could be established between the course of the consolidation movement and general business conditions, with special reference to the factor of competition. That the suppression of competition or at least its regulation is one of the chief objects aimed at in consolidation is so obvious as to require no argument. Whether consolidation has been forced by competition, as has often been asserted, is another matter. Unfortunately the causes entering into the problem are so numerous that it is difficult to discuss any one separately. The period covered by the table, moreover, is probably too short to permit of the deduction of general laws with any degree of safety. It is at once evident, however, that years of abnormal depression, such as 1893 and 1896, are highly unfavorable to the organization of consolidations. On the other hand, the general high degree of prosperity in the latter part of 1899 inclined many manufacturers to retain the control of their business rather than accept consolidation proposals, and to some extent interfered with consolidation progress. In a general way, bearing in mind that the causes operating

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in a given year may not be immediately reflected, it appears that periods when competition is extremely keen but before it has reached the point of extreme depression or panic are particularly calculated to encourage consolidation plans. This would agree fairly well with the figures given for the early nineties and also for those of 1899. There is no doubt, therefore, that competition is one of the important elements entering into the causes of industrial consolidation. On the other hand, the desire of securing inordinate profits by the sale of watered stock has played no small part in the movement.

The figures of average yearly capitalization per company (see chart No. 2) show at once that there has been no uniform tendency in this respect. On the contrary, the average has varied with much irregularity. It is not safe at once to jump to the conclusion that the years in which the average is largest are those when over-capitalization, which is unfortunately characteristic of the industrial consolidation movement as a whole, was most severe. The amount of capitalization, in other words, does not measure the amount of over-capitalization. There was far more over-capitalization in the American Fisheries Company, with $10,000,000 of stock, than in the Standard Oil Company with $100,000,000. The fact that in some years only a small number of companies were formed also tends to lower the value of the averages for purposes of comparison. It may, however, be worth noting that of the companies formed in 1893, when the average capitalization reached the highest point, the three largest, *viz.*, the United States Leather Company, the United States Cordage Company, and the Union Typewriter Company, were anything but conspicuous successes. The Leather "Trust" is now heavily in arrears upon its preferred stock dividends, and the same was until recently true of the Union Typewriter Company (which is now in more prosperous condition), while the history of the Cordage consolidation is too dismal to require mention. Of the companies organized in 1898, when the

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average capitalization was also exceptionally high, four, or twenty per cent of the total number, have been notably unsuccessful. These are the American Linseed, the American Fisheries, the International Silver and the National Shear companies. It is only fair to say that the average in 1898 was brought up considerably by the fact that the total $200,000,000 authorized capitalization of the Federal Steel Company is used, while only about half that amount is issued. Using the issued capitalization of that company, the average for the year would be brought down to about $31,224,000. On the other hand, it does not appear that those companies formed when the average capitalization is lowest have been especially successful. Of the thirteen formed in 1890, four were later forced to go through the process of reorganization, and several of those incorporated in 1888 and 1896, when the average was also low, have made unsatisfactory showings.

In the years 1899 and 1900 the decline in average capitalization probably does indicate a certain amount of reduction in over-capitalization. The unwillingness of the public to take up industrial securities in the latter part of 1899 made bankers more cautious about financing such companies, and as a result promoters were in several cases forced to cut down their plans for capitalization. If, moreover, in arriving at the average for 1900, the Carnegie Company, with its unusually large capitalization of $320,000,000 (including bonds) is excluded, the average per company is brought down to about $14,500,000.

It appears, therefore, that figures of average capitalization should be used only with great caution in judging the merits of companies formed in any given year, but they are not without value.

It may be worth passing mention that the organization of industrial consolidations is largely effected in the early months of the year. An analysis on this point of the 164

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companies formed since 1894 shows that the dates of incorporation are distributed as follows: —

Number incorporated in		*Number incorporated in*	
January	17	July	14
February	14	August	14
March	25	September	10
April	17	October	6
May	10	November	8
June	20	December	9
Total six months,	103	Total six months,	61

The same comparison is shown more graphically by Chart No. 3.

The distribution by months is easily explained. A large majority of these companies are financed in New York, and it is usually in the early months of the year that New York bank reserves accumulate and money becomes cheap or at least that interest rates work lower. This is a highly important consideration. Although the organization of these consolidations has been effected largely on a stock basis, a considerable amount of money is needed to provide working capital or to purchase outright plants that can be secured only for cash. When in the late spring of 1899 rates for money in New York advanced sharply, a decided check was given to the consolidation movement and many projects apparently on the eve of successful consummation were suddenly shelved, in many cases to be abandoned completely. The rather large number of charters taken out in June, July and August represents in part the completion of plans undertaken earlier in the year. The mid-summer months are unsuited for the organization of large corporations not only on account of the weather but because the vacation season finds many of those interested in such deals widely separated. In consequence, comparatively few companies are brought out in the late months of the year. New enterprises are, however, undertaken in those months which reach completion later.

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The tariff has of course often been held responsible for the "Trusts." On this point the compilation gives little information of value. During the greater part of the period under consideration relatively high duties have been in force, while in the period covered by the lower so-called Wilson Tariff, other causes were at work which would in themselves account for the decreased activity in those years. To those who see in the tariff the chief cause of consolidation, it may be remarked that the protective policy was in effect for a score of years before the organization of "Trusts" attracted attention, while in Great Britain with its "Free Trade" policy, the organization of similar consolidations has also reached large proportions. It is not intended to assert that the tariff has had no influence upon industrial organization. This question, however, involves an argument of the "Trust" problem as a whole, which is not within the scope of this article.

To summarize briefly: It is admitted that competition has been one of the most active factors in the creation of trusts. On the other hand, the movement has been largely affected by the opportunity for disposing of the securities such corporations. The law of supply and demand has a direct application. Had the public continued in 1900 to purchase such securities with the same readiness they showed in 1899, there is little reason to doubt that the movement would have suffered no setback. It cannot be insisted too strongly, therefore, that those who contend that competition is entirely responsible for industrial consolidation ignore a factor of great if not of equal importance.

The compilation has been brought down only to the close of 1900. As this article is going to press, negotiations are nearing completion for the consolidation of nine[1] large com-

[1] NOTE.— These nine companies are: Carnegie Co., Lake Superior Consolidated Iron Mines, Federal Steel Co., American Steel & Wire Co., National Tube Co., National Steel Co., American Tin Plate Co., American Steel Hoop Co., and American Sheet Steel Co.

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panies above named into a single concern, styled the United States Steel Corporation, with a stock capitalization of what will probably be nearly one billion dollars, and a bond issue of over $300,000,000. While on account of the duplication noted, this company would add comparatively little to the net total of capital for the period, it would materially affect the figures of average capitalization per company were the table brought down to cover the current year. It may be worth noting that this "consolidating of consolidations," which is already indicated in the compilation, bids fair to become more frequent in future with, of course, an accompanying increase in average capitalization.

APPENDIX A.

In order to avoid burdening the table further with footnotes the following explanation of the duplications has been prepared. The year in which the reference first occurs is given at the left: —

Previous to 1887.— Standard Oil Trust succeeded in 1900 by Standard Oil Co. of New Jersey. American Cotton Oil Trust succeeded in 1889 by American Cotton Oil Co. National Linseed Oil Trust succeeded by company same name in 1887. Absorbed by American Linseed Co. in 1898.

1887.— National Cordage Co. succeeded in 1893 by United States Cordage Co. which reorganized in 1896 as Standard Rope & Twine Co. Sugar Refineries, succeeded in 1891 by American Sugar Refining Co. National Lead Trust succeeded by National Lead Co. in 1891. Distilling & Cattle Feeding Trust succeeded by company same name 1890, reorganized as American Spirits Mfg. Co. (1895), which with Manhattan Spirit Co. (1893), Spirits Distributing Co. (1896), Standard Distilling & Distributing Co. (1898), and Kentucky Distilleries & Warehouse Co. (1899) were in 1899 consolidated as the Distilling Company of America.

1889.— Illinois Steel Co. absorbed by Federal Steel Co. in 1898.

1890.— American Biscuit & Mfg. Co., New York Biscuit Co., United States Baking Co. absorbed by National Biscuit Co. in 1898. National Starch Mfg. Co. absorbed by National Starch Co. in 1900. Distilling & Cattle Feeding Co. (see above under 1887).

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1891.— Consolidated Steel & Wire Co. absorbed by American Steel & Wire Co. of Illinois in 1898, later merged in American Steel & Wire Co. of N. J. in 1899. National Tube Works Co. acquired by National Tube Co. in 1899.

1892.— Hecker-Jones-Jewell-Milling Co. acquired in 1899 by United States Flour Milling Co. (which see). Herring-Hall-Marvin Co. reorganized in 1900. Michigan Peninsular Car Co. absorbed by American Car & Foundry Co. in 1899.

1893.— Manhattan Spirit Co. (see above under 1887). United States Cordage Co. reorganized as Standard Rope & Twine Co. in 1896.

1894.— Carnegie Steel Co. purchased by Carnegie Company in 1900.

1895.— American Spirits Mfg. Co. (see above under 1887). Consolidated Ice Co. acquired by American Ice Co. in 1899. Weisbach Commercial Co. acquired by Weisbach Co. in 1900.

1896.— Spirits Distributing Co. (see above under 1887).

1897.— Shelby Tube Co. acquired by Shelby Tube Co. in 1900.

1898.— American Fisheries Co. reorganized as the Fisheries Co. in 1900. Atlantic Snuff Co. purchased by American Snuff Co. in 1900. Standard Distilling & Distributing Co. (see above under 1887). Union Tobacco Co. purchased by American Tobacco Co. in 1899.

1899.— American Saddle Co. purchased same year by American Bicycle Co. Asphalt Co. of America acquired by National Asphalt Co. in 1900. Columbia Electric Car Lighting & Brake Co. acquired by Consolidated Railway Electric Car Lighting & Equipment Co. in 1900. Kentucky Distilleries & Warehouse Co. absorbed same year by Distilling Co. of America. United States Flour Milling Co. reorganized as Standard Milling Co. in 1900. United Starch Co. acquired by National Starch Co. in 1900.

APPENDIX B.— Reductions in Capitalization.

Date of incorporation.

1887.— Southern Cotton Oil Co. reduced to $2,000,000 in 1895. National Lead Trust reorganized in 1891 with $30,000,000 capital.

1889.— Consolidated Car Heating Co. reduced to $1,250,000 in 1893.

1891.— American Lithographic Co. reduced to $4,000,000 in 1896. National Rice Milling Co. reduced to $1,500,000 in 1900.

1892.— American Typefounders Co. reduced in 1896 to $4,000,000. General Electric Co. reduced in 1898 to $2,551,200 preferred, and $18,276,000 common stock.

1898.— American Fisheries Co. (see Fisheries Co., 1900).

Note.— The change from the "trust" form of organization to the corporate, made by several trusts early in the nineties, was due to court decisions holding the earlier form illegal.

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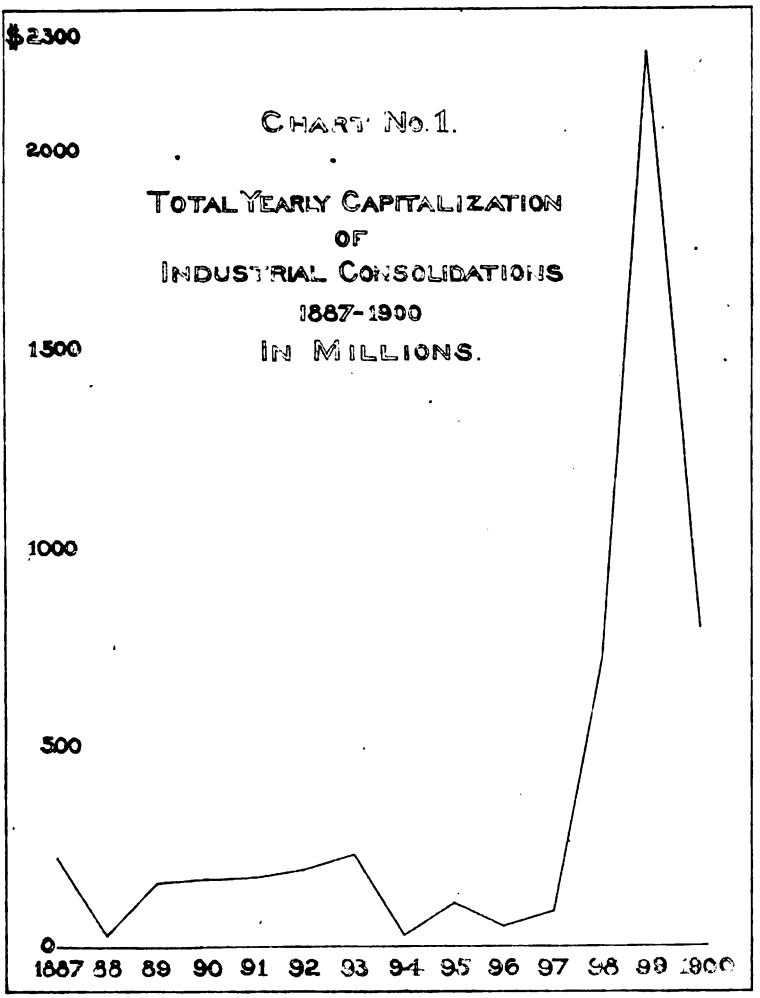

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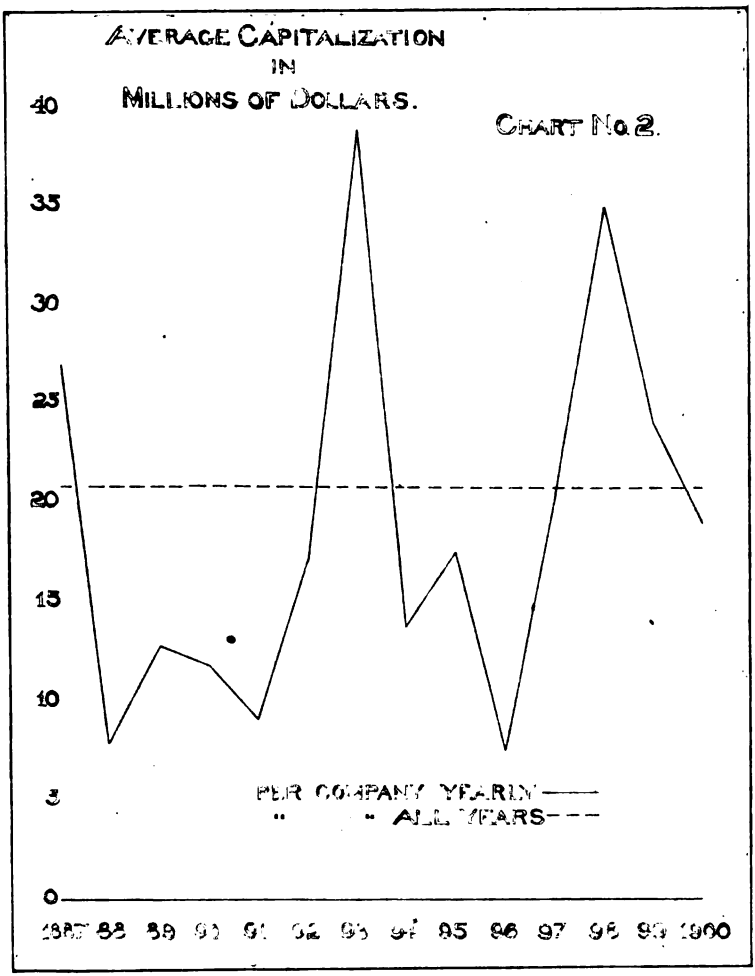

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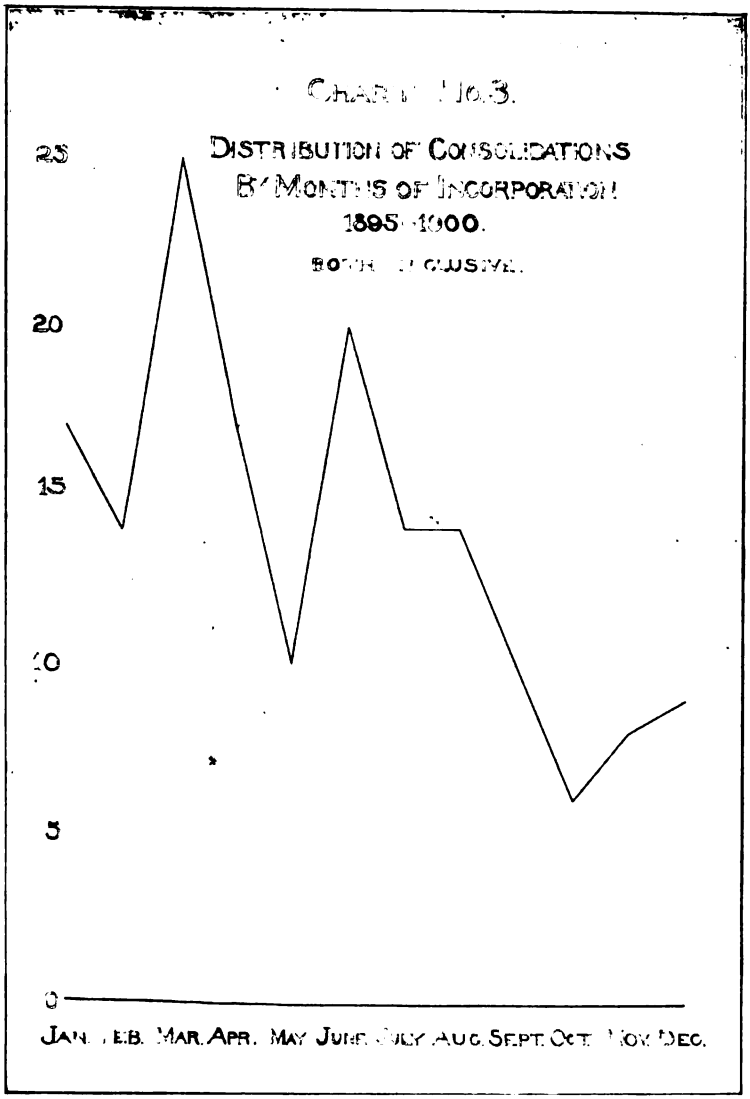

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THE ENUMERATION OF CHILDREN.

By Allyn A. Young.

Experience has shown that it is extremely difficult to ascertain the true number of young children in any population by simple enumeration. It is unfortunate that this is the case, for there are few census inquiries which can yield results more instructive than accurate information about the number of young children would be. Lacking in the United States an adequate system of registration of births, we are compelled to use the number of children less than one year old as reported by the census in the determination of birth rates. The value of an accurately known birth rate in the study of social conditions is generally recognized. It is undoubtedly the importance of such statistics that has drawn attention to the unsatisfactory character of the data on which they must be based.

The inaccuracy of census reports of the number of young children is not merely a matter of presumption, but can be definitely proven. Under normal conditions there must always be in any population more children in the first year of life than in the second, more in the second than in the third, and so on. The probability of variation from this regular diminution of the numbers reported at successive ages increases with advancing age. The mortality during the first year of life is so great that the number of children less than a year old is normally much larger than the number one year old. A reversal of this relation cannot be caused by ordinary fluctuations of birth and death rates. If in any population there are more children one year old than under one, the cause had operated suddenly and rapidly. Birth rates very rarely change otherwise than gradually, and death rates do not often experience such sudden and wide variations as would be necessary to cause the abnormal condition

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referred to above. However, such changes might be wrought in death rates by the outbreak of a severe epidemic among children. So marked a change of the birth rate could scarcely be caused by anything less efficacious than an important war. The argument is, of course, that if a census reports more children one year old than under one, and if common observation has failed to detect such abnormal conditions during the previous year, the census figures cannot be regarded as accurate.

That there should be more children two years old than one year old, or more children three years old than two years old, is scarcely as improbable as the hypothetical condition just considered. With increasing age comes increasing opportunity for the play of disturbing factors, including migration. These disturbances could hardly effect the regular diminution of the numbers reported at successive ages for the country at large,[1] but such effects might be visible in the age constitution of the population of specific localities. Thus, when we examine the age tables of the United States census of 1890 and find that, while there were more children reported as under one than one year old, there were more reported at each of the next higher ages than at under one or one, we are forced to conclude, *a priori*, that the census returns are not accurate. But, on the other hand, when we examine the returns of the census of Berlin in 1890, and find that more female children reported as living at the date of the census were born in 1887 than were born in 1888, we are not justified in making any *a priori* conclusions about the accuracy of the census returns. A further study of the matter shows that while there were more females born in Berlin in 1888 than in 1887, those born in 1888 were subjected to a

[1] The varying social and economic conditions of a country with an area so large and a population so heterogeneous as those of the United States must result in an age constitution (so far as the early years of life are concerned) approximating an ideal or theoretical age distribution much more closely than could be expected for the population of a single city. The fact that migration in the early years of life is usually to comparatively short distances tends to bring about the same result.

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higher rate of mortality. This alone was not sufficient to reduce those born in 1888, so that at the date of the census they numbered less than those born in 1887, but it was aided by an excess of immigration over emigration of children born in the earlier year, coupled with an excess of emigration over immigration of children born in the latter year.[1]

Thus the inaccuracy of census age returns may often be determined by simple inspection. But when the question of the accuracy or inaccuracy of the returns of children at any particular census has been satisfactorily answered, there still remains a more difficult problem for solution. If the number of children reported as one, two, or three years old is less than the truth, what is the nature of the deficiency? Have the ages of a number of young children been incorrectly reported, or have these children been omitted in the enumeration? If the deficiency is due to wrongly reported ages, the error is analagous to that which prevails in the age returns of adults and does not effect the general accuracy of the enumeration. But if we accept the hypothesis of omissions we discredit the truthfulness of the count of the population. The importance of the determination of the true source of error is evident.

The United States census did not ascertain the ages of children by single years until the introduction of vital statistics as a field of investigation in 1850. In that year it was found that 2.7 per cent of the population were under one year of age, while 15.1 per cent were under five years of age. In 1860, 2.8 per cent of the population were less than one and 15.4 per cent less than five years old. These figures were at first generally accepted as correct, and, in connection with the statistics of immigration, were made the basis of frequent calculations of the proportions of the populations who were of foreign descent and who were of "American Stock."[2]

[1] See *Die Bevölkerungs- und Wohnungs-Aufnahme vom 1. December 1890 in der Stadt Berlin*, Zweites Heft, p. 4.

[2] This rather indefinite term seems to have been generally used as including all those residing in the United States at the time of the Revolution, and their descendants. The increase of immigration had aroused interest in this question.

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Dr. Edward Jarvis, however, challenged the accuracy of the census statistics. His argument may be found in his noteworthy article on "Immigration," which appeared in 1872.[1] He based his conclusions on a comparison of the number reported as under five years of age in 1850 and the number reported as 10 years older — that is, as over 10 and under 15 — in 1860. His calculation of the number of children who must have been living in 1850 to account for the number of survivors in 1860 was based on Farr's English Life Table, careful allowances being made for the effects of immigration. Dr. Jarvis concluded that 17.6 per cent of the children under five and 32.8 per cent of the children under one had been omitted in the count of 1850. An analysis of the validity of Dr. Jarvis' methods gives rise to considerable hesitancy in accepting the accuracy of his estimates of the amount of deficiency. In the first place, how closely the English Life Table fitted the American conditions of that time is a matter of uncertainty. Dr. Jarvis' unhesitating acceptance of the accuracy of our immigration statistics must also be criticised as there is reason to believe they were seriously deficient. But whatever one may think of the degree of accuracy of the results, there can be no question but that Dr. Jarvis proved definitely that the census reports of the number of young children were deficient. That this deficiency might have been caused, in part at least, by misstatement of age does not seem to have occurred to Dr. Jarvis, for he states definitely that "446,923 children under five years old must have been overlooked and omitted in the census of 1850."[2]

General Francis A. Walker, as superintendent of the census of 1870, helped toward the solution of this question by publishing more complete statistics of the ages of children than had been given previously. Not only was the number of children at each age under five differentiated, but for those under one the month of birth was given — a completeness

[1] *Atlantic Monthly*, April, 1872.
[2] *Loc. cit.*, p. 461.

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of detail not imitated in either the Tenth or the Eleventh Census. General Walker's discussion of these returns was a distinct contribution to the knowledge of the subject. In his first report,[1] written before the census returns had been fully tabulated, he said: —[2]

I have for some time held the opinion that the inadequate representation of persons under one year of age was due to the tendency to speak of infants between eleven and twelve months, and even between ten and eleven months, as a year old, and that, therefore, the effects complained of did not result from the omission of names from the schedules, but from erroneous classification. The result of the inquiry has been to substantiate this view most strikingly, and while explaining the inadequacy of the return of children under one year at this and previous censuses, to furnish ample material for correcting and completing the statement.

General Walker had based the conclusions just quoted on the returns of the month of birth for children under one in six states. When the final tables were compiled, showing the distribution of the population less than five years old by single years, General Walker acknowledged the inadequacy of his explanation. In his final discussion of the subject he said: —[3]

Candor compels the Superintendent to confess that the problem is more complex than appeared at the date of the report of December, 1871, and that results of subdividing the period 1 to 5 show a vice of classification extending much further than from the last quarter of the first year to the end of the second. The second year itself was found to be deficient, and it was found that any plan for compensating the loss of the "under 1 year" period must involve the re-grading of pretty much the whole period under 5.

General Walker placed the matter in the hands of Mr. E. B. Elliot, then Actuary of the Treasury Department, whose experience in vital statistics, and especially in the construc-

[1] Reprinted in *Ninth Census*, 1870, *Population*, pp. ix-xlix.
[2] *Loc. cit.*, p. xxi.
[3] *Ninth Census*, 1870, *Vital Statistics*, p. 516.

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tion of life tables, was expected to be of service in the re-distribution by single years of the number reported as less than five years old. Mr. Elliot, in his report,[1] did not discuss the cause of deficiency,[2] but made two adjustments of the irregular returns; the first "based on the assumption that there is no actual deficiency in the number of persons enumerated, but that the irregularities observed are due exclusively to an erroneous distribution of the numbers as regards age," and the second based on the assumption that in "addition to a faulty distribution, there were, with regard to the younger ages, actual deficiencies in the returns." Mr. Elliot adds, "The latter assumption is deemed the more probable." The number of omissions of children under five assumed by Mr. Elliot for his second adjustment is 100,000.

Thus, the discussion of this important question had reached, in 1872, an interesting and promising point. But it seems that Gen. Walker, in the multiplicity of duties occasioned by the encyclopædic character of the Tenth Census, did not give to the question of the accuracy of the enumeration of children the consideration which it had received in the Ninth Census. The ages of children under one were not, in 1880, differentiated by months, as in 1870. Dr. J. S. Billings, who contributed the discussion of vital statistics, did not treat this subject further than to say that "the number of children reported as living, under 1 year of age, is too small, owing to omissions and the tendency to report ages in round

[1] Contained in *Ninth Census*, 1870, *Vital Statistics*, pp. 517-531.

[2] However, Mr. Elliot made an important suggestion that is worth quoting: "An important influencing cause of the irregularities is believed to be found in the fact that, although the enumeration was made with reference to the population as it existed on the 1st day of June, 1870, yet the actual collection of facts by the marshals was extended over a period of several months subsequent to that date, some of the enumerations having been made as late as nine months after the date designated by law. Inquiries, therefore, relative to the month of birth of children under the age of twelve months, living on the first day of June, 1870, required, not infrequently, that investigation be made relative to the month of birth of children who were, at the date of actual enumeration, from 16 to 20 months of age. With respect to these more distant months of birth, it is believed that there was less effort, in general, by the enumerator to secure the requisite information, and greater difficulty encountered in successfully conducting the inquiries. — *Loc. cit.*, pp. 520, 521.

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numbers, causing many infants 10 or 11 months of age to be reported as 1 year old."[1] So far as the United States is concerned, the discussion of this question may be said to have stood where it was left by Dr. Jarvis and General Walker in 1872, until the publication of the results of the census of 1890, which showed a very marked decrease in the proportion of children in the population during the decade from 1880 to 1890.[2]

The report on Vital and Social Statistics of the Eleventh Census contained a discussion of the age distribution of the population,[3] in which attention was called to the deficiencies in the enumeration of children and an attempt made to estimate the amount of deficiency. Mr. William A. King, Chief of the Division of Vital Statistics in the Eleventh Census published later an elaboration of this study[4] in which he reached rather disparaging conclusions respecting the accuracy of the enumeration. Mr. King endeavored to obtain a quantitative statement of the deficiency in the number of children under one and under five years of age, as did Dr. Jarvis in 1872, but the methods pursued were entirely different. Mr. King's study was confined to the returns for Massachusetts and was based on the registration of births and deaths. His estimate of the deficiency in the reported number of children for the United States was based on the assumption that the percentage of deficiency would not be less for the whole country than it was for Massachusetts. He concluded that the deficiencies in the reported number in 1890 amounted to approximately 25 per cent of those reported as less than one and 14 per cent of the num-

[1] *Tenth Census*, 1880, *Mortality and Vital Statistics*, p. cxl.

[2] In 1880, children under five were 13.79 per cent of the total population; in 1890, only 12.22 per cent. In the first returns of the age distribution of children examined in 1890, the decrease was so marked that it was thought that errors had been introduced by the use of mechanical tabulating devices. These returns were accordingly re-tabulated by hand, with the same results. See *Eleventh Census*, 1890, *Vital and Social Statistics*, I, p. 490.

[3] Part I, pp. 487-493.

[4] "The Decrease in the Proportion of Children." *Political Science Quarterly*, Dec., 1897.

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ber reported as less than five,[1] and that in 1880 the corresponding deficiencies were 5 per cent and 2.8 per cent. The details of Mr. King's study are worked out with great care and if his results are misleading it is because of faults in his premises. The importance of a knowledge of the accuracy of the census will justify an examination of Mr. King's results, as well as a study of other aspects of the apparent deficiency in the proportion of children.

It should be noted, in the first place, that Mr. King has failed to take account of the effect of the change in the age question from "age at last birthday" in 1880 to "age at nearest birthday" in 1890. If the question was answered in 1890 in accordance with the instructions, nearly half the children who would have been returned as five years old if the age at last birthday had been asked must have been returned as six years old. The number under five must have been correspondingly depleted. To attempt an estimate of the amount of this depletion seems unwise, as it is difficult to determine just how faithfully the instructions relating to the mode of asking the question were followed at either census. On the other hand, it is equally impracticable to ascertain the amount of deficiency of children "under five" in the census of 1890, and, indeed, it may reasonably be doubted that the returns show a deficiency greater than that of the 1880 census.[2] The ages of children under one were secured at both censuses by months, so that the greater deficiency which Mr. King found in the returns of this class for the

[1] That is, that nearly 400,000 children less than 4 year old, and over a 1,000,000 less than five years old, were omitted.

[2] In this connection it is interesting to note the effects of a similar change made in the form of the age question in the Rhode Island census of 1885. While the total population had increased in the decade between 1875 and 1885 from 258,239 to 304,284, the number of children under two years of age decreased by 1419. Mr. Amos Perry, superintendent of the census of 1885, was at a loss to explain the decrease. He wrote: "It is not altogether pleasant to contemplate this result. Either the mortality among young children is excessive, or there is a decided falling off in the number of births, indicating a disinclination to the rearing of a family, a decrease in the number of marriages, or of reproductive vigor." (*Rhode Island State Census*, 1885, pp. 419, 420.) As a matter of fact the decrease can probably be entirely accounted for by the change in the form of the age question.

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census of 1890 must be regarded as constituting a serious problem.

Before passing on to a study of this deficiency, attention must be called to the fact that Mr. King has disregarded the possibility of any explanation of the deficiency in the number of young children other than that of omissions in the enumeration. We have seen that misstatement of age is a possible cause of such deficiencies. But Mr. King's proof of a *greatly increased* deficiency in the returns of children under one in the census of 1890 points to a peculiar condition, and one that deserves careful consideration. For a solution of the problem we must determine whether the cause of the deficiency lay in omissions or in misstatement of age, and why this cause was more effective in 1890 than in 1880.

With reference to the general misstatement of children's ages, probably no higher authority could be quoted than Dr. William Farr, who in 1865 wrote with respect to the English census of 1841 that:[1]

Not only the children of one and under two, but also the children of 2 and under 3 years of age are returned as more numerous than the children in the first year of age (0–1), which, looking at the great increase and great regularity of the births, as well as the great number of deaths in the first two years of life, is impossible. In reflecting upon this, it appeared evident to me that the discrepancy in the ages arose from a certain number of children in the *first year* of age, who should have been placed against zero (0), having been carried on to 1; while children in the *second year* of age, who should have been set down against one year of age, were carried on to 2, when the excess was at a maximum; the errors afterward more nearly counterbalancing each other.

The subsequent experience of the English registration office has been such as to confirm Dr. Farr's explanation, for the editor of their latest census returns[2] says of the age returns of children:[3]

[1] Reprinted from *Journal of the Statistical Society*, Vol. xxviii, in Farr's *Vital Statistics*, p. 208.

[2] Presumably Dr. William Ogle.

[3] *Census of England and Wales*, 1891, *General Report*, p. 27.

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We are, however, bound to say that these single year returns are, in our opinion, excessively untrustworthy, owing to the vagueness with which parents use the terms "one year old," "two years old," etc., in speaking of their children, sometimes meaning that the child is in its first or second year, as the case may be; sometimes that it has completed that year of life.[1]

An inspection of the age distribution of the population less than five years ago, will throw some light on this tendency to over-statement. The following table shows the number reported at each age, and the percentage which that number makes of the total number under five, according to the age returns of the United States census of 1880:[2]

Age	Under 1	1	2	3	4
Numbers	1,447,983	1,256,956	1,427,086	1,381,274	1,401,217
Percentages	20.94	18.18	20.64	19.97	20.27

These returns show a marked deficiency in the number of children in the second year of life. It is evident that if the hypothesis of over-statement is sound, the asking of the ages of children under one by months has lessened the tendency to over-statement in that year, so that the second class has gained less from the first than it has lost to the third. A study of the age distribution of children enumerated in censuses of other countries shows that this deficiency in the second year of life is not confined to the United States. The following table shows the percentage which the number reported at each of the first three years of life makes of the total under five in other censuses. In these countries the age question relates to the last birthday and the ages of children under one are obtained in months, as in the United States.

[1] Such observations have not been confined to England. Mr. T. A. Coghlan, former Government Statistician of New South Wales, observed that "there is a curious propensity on the part of those who supply information for the census schedules to return young children as being one year older than they really are. This peculiarity was noted by the late Professor Pell in the Census of 1871, and is also a general experience." (*Census of New South Wales*, 1891, *Statistician's Report*, p. 138.)

[2] The returns for 1890 are not used because of the confusion introduced by the change in the form of the question.

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CENSUSES ASKING AGE AT LAST BIRTHDAY.

Country.	Date of Census.	Percentage of Total Under Five.		
		Under 1.	1.	2.
Canada	1891	19.96	17.06	21.43
Denmark	1890	20.48	20.41	19.93
England and Wales	1891	21.23	19.46	19.90
France	1896	20.56	18.83	20.69
Ireland	1891	19.30	17.83	20.47
New South Wales	1891	20.99	19.46	20.28
New Zealand	1891	19.76	17.83	20.75
Scotland	1891	21.43	19.07	19.98
South Australia	1891	20.50	19.10	20.16
Tasmania	1891	21.37	17.82	20.43
Victoria	1891	22.06	19.78	19.90
Western Australia	1891	21.98	19.91	20.10

In each of the censuses included in the table, with the exception of the census of Denmark, the number in the second year of life is less than the number in either the first or the third year. This evidence of a general over-statement of the ages of children is very nearly conclusive. It is strengthened, however, by a similar examination of the returns of those censuses in which the ages of the population are obtained by asking the date of birth. It is evident that the tendency to estimate the age of a child by the year of life, rather than the number of years completed, would not affect the accuracy of the answers to a question relating to date of birth.

CENSUSES ASKING DATE OF BIRTH.

Country.	Date of Census.	Percentage of Total Under Five.		
		Under 1.	1.	2.
Austria	1890	22.86	19.59	19.57
Belgium	1890	22.09	20.25	19.38
Germany	1890	22.22	19.94	19.79
Hungary	1890	22.50	17.34	20.19
Netherlands	1889	22.43	20.35	19.61
Norway	1891	22.30	18.86	19.43
Sweden	1890	20.90	19.70	19.90
Switzerland	1888	21.70	20.04	18.78

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In only three of these countries (Hungary, Norway and Sweden) is the number returned as in the second year of life greater than the number in the third year of life.[1] It can scarcely be assumed that the manner of asking the age question has any effect on the accuracy of the count, but it is clear that it might have a considerable effect on the accuracy of the age returns. As the deficiency of children in the second year of life is much more marked in censuses asking the age in years than in censuses asking the date of birth, we are justified in concluding that a large part of such deficiency is caused by misstatement of age.

In the United States census of 1890 the apparent deficiency of children in the second year of life, as shown in the following statement, is more marked than in any of the censuses just considered.

UNITED STATES CENSUS, 1890.

	Age.				
	Under 1.	1.	2.	3.	4.
Number reported at each age.....	1,566,734	1,077,008	1,729,817	1,631,988	1,629,146
Percentage of total number under 5	20.52	14.11	22.66	21.37	21.34

Professor W. F. Willcox has pointed out[2] that if the question of "age at nearest birthday" was answered according to instructions, and if all children in the first twelve months of life were tabulated as "under one year," the number entered as one year old would have included only those between 12 and 18 months. It is scarcely possible that the ages of so many as 14.11 per cent of the children under

[1] In Sweden this irregularity exists only in the returns from the rural districts; the age distribution of children in the cities being exceptionally regular. In the census reports of Hungary, attention is called to the deficiency of children one year old, and it is stated that it cannot be explained except by assuming inaccuracies in the census. See *Ergebnisse in den Ländern des Ungarischen Krone am Anfange des Jahres 1891 durchgeführten Volkszählung.* I. Theil, 126.

[2] *The Federal Census*, Publications of the American Economic Association, new series, No. 2, p. 56, note.

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five were in this six months period. The proportion is so large as to indicate that many children were counted as one year old whose true ages were below 12 or above 18 months. It might be assumed that in those parts of the United States in which this proportion is exceptionally large, the ages of children have been reported with special inaccuracy. An examination of the following statement, which shows these proportions for each State and territory, does not sustain this assumption.

STATES IN ORDER OF THE PROPORTION OF CHILDREN ONE YEAR OLD TO TOTAL UNDER FIVE, 1890.

Wyoming	15.39	Pennsylvania	13.93
Arkansas	15.26	Oklahoma	13.91
North Carolina	15.21	Michigan	13.91
Mississippi	14.96	Arizona	13.87
Georgia	14.91	Maine	13.85
South Carolina	14.89	New Jersey	13.80
West Virginia	14.79	Illinois	13.80
Nebraska	14.59	Colorado	13.80
Louisiana	14.54	Texas	13.75
Alabama	14.50	Kansas	13.68
Virginia	14.48	Washington	13.67
Utah	14.48	Ohio	13.66
Tennessee	14.42	California	13.61
Florida	14.34	Missouri	13.58
Minnesota	14.27	New Hampshire	13.56
Connecticut	14.26	Vermont	13.52
Montana	14.25	Rhode Island	13.50
Wisconsin	14.24	Idaho	13.49
Kentucky	14.18	Indiana	13.48
North Dakota	14.14	Delaware	13.30
New Mexico	14.12	Maryland	13.25
Iowa	14.06	Nevada	13.22
South Dakota	14.01	Oregon	13.05
Massachusetts	13.97	District of Columbia	12.08
New York	13.97		

The States in which the percentages are greater than the proportion for the entire country (14.11) form two groups, one including all the States of the South Atlantic and South Central divisions, except Delaware, Maryland and the District of Columbia on the north, and Texas and Oklahoma on the west. The other group includes Wisconsin, Minnesota,

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North Dakota, Nebraska, Montana and Wyoming in the northwest, and extends southward to include Utah and New Mexico. Connecticut is the only State outside of these two groups having a proportion larger than 14.11 per cent. It is not surprising that in the first group, comprising States having a large colored population, the ages of children have not been returned very accurately, but that there is a similar degree of inaccuracy in the returns from the northwestern States, where the urban population is small and the percentage of illiteracy low, seems scarcely probable. A study of the corresponding returns for 1880 may suggest an explanation of the difficulty. At that census, according to the instructions to enumerators, all children over twelve months and under two years of age should have been returned as one year old. As we have already seen, the proportion of children one year old to the total under five in 1880 was not too large, the proportion for the United States as a whole (18.18) being considerably too small. It has also been shown that the principal cause of this deficiency was undoubtedly the habit of over-stating the ages of children. The following statement, showing the percentages which the children one year old made of the number under five in 1880, indicates that over-statement of children's ages was especially common in the southern States.

There is no reason to suppose that this tendency to over-statement of the ages of children and to the resulting diminution of the number reported as one year old was not operative in 1890. But, as has been shown, there was in that year a conflicting tendency which operated to swell the number of those reported as one year old. As this tendency was not apparent in 1880, it may be assumed that it was due to the change in the form of the age question to "age at nearest birthday." In view of the presence of these two conflicting tendencies, we are compelled to abandon the hypothesis that in the census of 1890 an especially large

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STATES IN ORDER OF THE PROPORTION OF CHILDREN ONE YEAR OLD TO TOTAL UNDER FIVE, 1880.

Utah	19.57	Wisconsin	18.20
Washington	19.39	Illinois	18.16
North Carolina	19.08	Kansas	18.14
Minnesota	18.96	Ohio	18.14
West Virginia	18.96	New Jersey	18.07
Dakota	18.95	Connecticut	18.07
Rhode Island	18.90	Arkansas	18.07
Nebraska	18.76	California	18.01
Vermont	18.71	Nevada	17.94
Pennsylvania	18.68	Colorado	17.87
Tennessee	18.67	New York	17.83
Indiana	18.66	Kentucky	17.81
Michigan	18.66	Delaware	17.71
Maine	18.62	Maryland	17.69
New Hampshire	18.61	Missouri	17.69
Wyoming	18.57	Alabama	17.67
Iowa	18.54	Texas	17.48
Idaho	18.48	Mississippi	17.18
South Carolina	18.46	Arizona	16.97
Massachusetts	18.43	Florida	16.95
Virginia	18.39	Louisiana	16.78
Georgia	18.37	District of Columbia	16.33
Montana	18.34	New Mexico	14.58
Oregon	18.30		

proportion of children one year old, as compared with the number under five, indicates a corresponding inaccuracy in the returns. The size of the proportion varies with the relative strength of the two tendencies to error which have just been considered. In this fact we have the key to the apparent inaccuracies in the age returns of the northwestern States.

It is not unreasonable to assume that the relative strength of the tendency in any State to over-state the ages of children one year old was, as compared with the strength of the tendency in other States, nearly the same in 1890 as in 1880. If, then, we subtract the percentages representing the ratios between the children one year old and the number under five in 1890 from the corresponding percentages for 1880, we will eliminate the effects of this tendency. If our hypotheses are sound, the variations in the sizes of the

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resulting differences will indicate corresponding variations in the influence which the change in the form of age question had upon the returns. The following statement of these differences shows that the States in which they are less than 3.75 per cent are, with the exception of Wyoming, in the South, and include most of the States in which the percentage of illiteracy is unusually large: —

STATES IN ORDER OF THE DIFFERENCES BETWEEN THE PROPORTIONS OF CHILDREN ONE YEAR OLD TO TOTAL UNDER FIVE IN 1880 AND 1890.

Washington	5.72	District of Columbia	4.25
Rhode Island	5.40	Tennessee	4.25
Oregon	5.25	West Virginia	4.17
Vermont	5.19	Nebraska	4.17
Indiana	5.18	Missouri	4.11
Utah	5.09	Montana	4.09
New Hampshire	5.05	Colorado	4.07
Idaho	4.99	Wisconsin	3.96
Dakota	4.89	Virginia	3.91
Maine	4.77	North Carolina	3.87
Michigan	4.75	New York	3.86
Pennsylvania	4.75	Connecticut	3.81
Nevada	4.72	Texas	3.73
Minnesota	4.63	Kentucky	3.63
Iowa	4.48	South Carolina	3.57
Ohio	4.48	Georgia	3.46
Massachusetts	4.46	Wyoming	3.18
Kansas	4.46	Alabama	3.17
Maryland	4.44	Arizona	3.10
Delaware	4.41	Arkansas	2.81
California	4.40	Florida	2.61
Illinois	4.36	Louisiana	2.22
New Jersey	4.27	New Mexico	0.36

These results confirm the supposition that the relative amount of difference between the ratios of children a year old to children under five in 1880 and 1890 is a measure of the relative influence of the change in the form of age question, and accordingly support the hypothesis of two main causes of error affecting the number of those reported as one year old. Further evidence to this effect is given by an examination of the returns for the white and colored elements of the total population, as shown in the following table: —

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PROPORTION OF THE NUMBER OF CHILDREN 1 YEAR OLD TO THE TOTAL UNDER 5.

	Total.	White.	Colored.
1880	18.18	18.27	17.71
1890	14.11	14.01	14.69
Difference	3.07	4.26	3.02

As would be expected, the age question was answered more carefully by the whites than by the colored.[1]

Having thus determined that asking the age question, with reference to the nearest birthday, operated to increase the number reported as one year old, we have to solve the question of how this increase affected the neighboring years. Was it drawn principally from the "under one year" class, or from those who had passed their second birthday?

It will be remembered that General Walker based his conclusions with reference to the over-statement of ages in 1870 on the small proportion of children reported as in the last few months of the first year of life. In the census of 1880, the ages of children were not tabulated by smaller groups than years, but in 1890 the ages of children under one were classified by quarter years. In 1870 only 11.4 per cent of the children under one were reported as nine, ten, or eleven months old. The proportions in the various States ranged from 4.6 per cent in New Mexico and 8 per cent in South Carolina, to 17.9 per cent in New Hampshire. In 1890 20.8 per cent of the children under one were reported as in the last three months of their first year. The figures for the different States show that the minimum percentage in 1890 (16.6 per cent in Arizona) was nearly as large as the maximum in 1870. These results indicate that there was a great improvement in the accuracy of the returns between 1870 and 1890. How much of this increase took

[1] An examination of the age returns of the white and colored elements of the population in each of the southern States, shows that in two of these States — Virginia and Florida — the change in the form of the age question had more effect on the returns of the colored element than of the white. Evidently greater carelessness on the part of the enumerators co-operated with the greater illiteracy of the population in making age returns more inaccurate in the southern States than in the North.

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place between 1870 and 1880 cannot be determined, but as the census of 1870 was taken in the old manner — by United States Marshals — it seems probable that much, if not all, of this increase was between 1870 and 1880. Thus these figures neither prove nor disprove a greater over-statement of the ages of children under one in 1890 than in 1880.

Comparing the States in which the proportion of children in the last three months of the first year of life in 1890 was especially small with the States in which the proportion of children in the second year of life was exceptionally large, we find a general, although far from an absolute, agreement. But this is only cumulative evidence of the over-statement of ages of children under one, and in no way throws light upon the special problem under consideration.

Other methods failing us, it seems that the only way of determining whether there was an excessive over-statement of the ages of children in 1890 is by comparing census and registration statistics. It will be remembered that Mr. King's study related only to Massachusetts, and that it was an attempt to measure the deficiency in the number of children reported by the censuses of 1880 and 1890 by subtracting from the births within the year preceding the taking of the census the number of children born who had died within the same year. Mr. King had access to copies of the registration records, and was able to make a tabulation showing for those who were born and had died during the year "the month of birth by the month of death." But the published registration reports of Massachusetts and of other New England States do not classify the deaths at different ages by months. In the present study we shall be compelled to use the proportion of deaths of children under one[1] in any year, to the number of births in the same year

[1] The printed reports give the deaths at different ages only by calendar years. It will be necessary, accordingly, to assume that 5-12 of the total number of deaths under one in a given year were before, and 7-12 after June 1. This supposition does not accord with the

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as indicating the *infantile death rate.* Such a rate is valid only for comparative purposes. But by its use we shall be able to determine quite closely the *relation between census and registration statistics* in 1880 and in 1890, and will be able to attack the problem of the increased deficiency in the reports of children in 1890. In addition to the Massachusetts registration reports, the reports of Rhode Island are especially useful. The accurate character of the State censuses in these two States will enable us to extend our comparisons and to verify our conclusions.

As data relating to the number of children under one at each census, we have the number of births during the year preceding the taking of the census, the infantile death rate, and the number of survivors as returned by the census. We can then ascertain, by a simple proportion, what the number of survivors would have been in the earlier census if the death rate had been what it was in the later census, and if the relation between census and registration statistics had remained unchanged. Then, on the basis of the proportion of the adjusted number of survivors in the earlier census to the number of births during the preceding year, we can estimate the number of children who should have been living at the date of the later census. The difference between this estimated number and the number enumerated will be a very fair measure of the deficiency in the later census as compared with the earlier one. The following table shows such a comparison of the returns of the federal censuses of 1880 and 1890 in Massachusetts, Rhode Island and Connecticut. A comparison of the returns of the Rhode Island State censuses of 1875 and 1885 is included, because the age question in the earlier census related to "age at last

facts; infant mortality being higher in the summer than in the winter. The error thus introduced will, however, be very small and for comparative purposes may be disregarded. Neither is it necessary to make allowance for the foreign-born children included in the census and mortality reports. The number in the early years of life is so small, that to make such corrections would be to introduce useless refinements into a necessarily rough method.

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birthday," and in the later census to "age at nearest birthday," — the change being the same that was made in the federal census of 1890.

COMPARISON OF CENSUS AND REGISTRATION STATISTICS, I.

	Massachusetts.		Connecticut.		Rhode Island.			
	1880.	1890.	1880.	1890.	1880.	1890.	1875.	1885.
Births, year ending May 31	42,053	57,813	13,908	17,367	6,388	8,399	6,646	7,269
Deaths of children under 1 in year ending May 31...	6,411	9,322	1,927	2,481	797	1,422	862	1,025
Infantile death rate.....	152	161	139	143	125	169	130	141
Survivors, June 1, by census	37,586	43,043	12,879	14,469	6,132	6,890	6,297	6,065
Estimated number of survivors, based on the death rate of the later census and the ratio between registration reports and the earlier census.....	37,190	51,120	12,820	16,020	5,824	7,658	6,217	6,799
Apparent deficiency in later census.....	....	8,077	....	1,551	....	768	....	734
Percentage deficiency.....	....	15.8	....	9.7	....	10.0	....	10.8

The comparative deficiency of each census in which the age question related to the nearest birthday, is shown to be close to 10 per cent, except in Massachusetts, where the census of 1890 shows an apparent deficiency of nearly 16 per cent. This at once suggests a question as to whether Mr. King was justified in regarding the Massachusetts returns as typical.

The next table shows a similar comparison of the returns of children under one for Rhode Island and Massachusetts.[1] In computing the infantile death rate, it has been necessary to combine the deaths of children one year old, during the year ending with the taking of the census, with the deaths of children less than one year old during the preceding year.

[1] It has been necessary to omit Connecticut from this calculation, as the registration reports of that State do not give the number of deaths of children one year old.

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COMPARISON OF CENSUS AND REGISTRATION STATISTICS, II.

	Massachusetts.		Rhode Island.			
	1880	1890	1880	1890	1875	1885
Births during the 12 months ending 1 year before the census	40,856	56,175	6,509	7,973	6,141	7,192
Deaths	8,105	11,142	1,054	1,670	1,158	1,273
Infantile death rate	198	198	162	209	189	177
Survivors, June 1, by census	33,051	28,462	5,402	4,296	5,154	3,967
Estimated number of survivors, based on the death rate of the later census and the ratio between registration reports and the earlier census	33,051	45,450	5,099	6,246	5,230	6,124
Apparent deficiency in later census	....	16,988	....	1,950	....	2,157
Percentage deficiency	....	38	....	31	....	35

We have seen that in 1890 the class "one year" old should have included only those whose ages were over 12 and under 18 months, while in 1880 it included all over one and under two years. As compared with the figures for 1880, we should expect a deficiency of nearly 50 per cent. The deficiencies shown by the table are much smaller, and our previous conclusions regarding the excessive number reported as one year old in 1890 are confirmed by these figures. As in the case of children less than a year old, the largest deficiency is in Massachusetts.

A test of the hypothesis of an excessive over-statement of the ages of children under one, in 1890, is shown in the following table, which is constructed on the assumption that the deficiency of children under one, and the excess of children one year old, are correlated phenomena.

In each of the Rhode Island censuses the deficiency of children under one can be accounted for by over-statement of age, for when the amount of this deficiency is subtracted from the number reported as one year older, the percentage deficiency of children one year old is still considerably less

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COMPARISON OF CENSUS AND REGISTRATION STATISTICS, III.

	Massachusetts.	Rhode Island.	
	1890.	1890.	1885.
Reported number 1 year old	28,462	4,296	3,967
Estimated deficiency in reported number under 1 year of age	8,077	768	734
Number 1 year old less the deficiency in number under 1	20,385	3,528	3,233
Estimated number 1 year old	45,450	6,246	6,124
Apparent deficiency	25,065	2,718	2,891
Percentage deficiency	55	47	44

than 50 per cent. In Massachusetts, on the other hand, the deficiency of children under one is evidently too large to have been caused entirely by over-statement.

When we apply our method of comparison to censuses in which there was no change in the form of the age question, we get very different results. The following table shows a comparison of the returns of children under one in the censuses of Rhode Island for 1885 and 1890, and in the censuses of Massachusetts in 1875, 1885 and 1890. In these censuses the age question related to "age at nearest birthday."

The comparison of the two Massachusetts State censuses shows that there was either a decrease in the accuracy of the census, or a gain in the accuracy of the registration reports. There seems to be no reason why the count of children in 1885 should have been less accurate than in 1875. The census administration had not changed, and the instructions to enumerators, with reference to the age returns of children, were more complete and definite in 1885 than in 1875.[1] On the other hand, it would seem that there must have been a gain in the accuracy of the reports of children, and that the deficiency in 1885 must be due to the fact that our standard of measurement, — the registration of births

[1] For these instructions see *The Census System of Massachusetts for 1875*, Boston, 1876, p. 140, and Chas. F. Pidgin, *Practical Statistics*, Boston, 1888, p. 41.

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COMPARISON OF CENSUS AND REGISTRATION STATISTICS, IV.

	Massachusetts.				Rhode Island.	
	1875	1885	1885	1890	1885	1890
Births during the 12 months ending with the taking of the census	45,036	48,820	48,820	57,813	7,269	8,399
Deaths of children under 1	7,564	7,699	7,699	9,323	1,025	1,422
Infantile mortality	168	158	158	161	141	169
Survivors at date of census	34,040	35,888	35,888	43,043	6,065	6,890
Estimated number of survivors, based on the death rate of the later census and the ratio between registration reports and the earlier census	34,450	37,350	35,760	42,350	5,867	6,780
Apparent deficiency in later census	....	1,462	....	— 693	....	— 115
Percentage deficiency	....	3.9	....	— 1.6	....	— 1.6

and deaths — had also gained in accuracy, and more noticeably.

We have now found deficiencies in the number of children reported as less than a year old in the census of Massachusetts in 1890 when compared with the census of 1880, and in the census of the same State in 1885, when compared with the census of 1875. But we have also found that when we compare the returns of 1890 with the returns of 1885, the later census shows a slight excess. If the deficiencies are due to an improvement in the registration reports, the improvement must have occurred before 1885, and probably not before 1880. An examination of the Massachusetts registration laws sustains this supposition.

Before 1880 the laws relating to the registration of births provided only that parents should give notice to the clerk of their city or town of the births of their children; that householders should give notice of births happening in their houses, and that the clerk of the city or town should on or before the first day of February of each year, transmit to

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the Secretary of the Commonwealth copies of records of the births which had occurred during the preceding calendar year.[1] How such a law worked in practice may be judged from the following statement taken from the Massachusetts Registration Report for 1879.[2]

In properly estimating the value of the deductions from the registration returns for this State, the facts should be borne in mind . . . . that the births are got by a house-to-house visitation once a year, and many are, therefore, not reported.

On February 26, 1880, "An Act to Compel a More Accurate Registration of Births" went into effect. The law provided that physicians and midwives should report monthly to the clerks of the various cities and towns correct lists of all births at which they were present.[3]

In a foot note to the passage quoted from the Massachusetts Registration Reports of 1879, it is stated that "The law recently passed, requiring physicians to report all births, is not generally enforced." As this report is dated October 1, 1880, — only seven months after the new law took effect — the efficiency of the law could not have been very thoroughly tested. But if the law was enforced at all it is evident that there must have had a very considerable effect on the accuracy of the returns. No other law of importance affecting the registration of births was passed in Massachusetts, Rhode Island or Connecticut between 1875 and 1890.

We are now in a position to compare our results with those obtained by Mr. King. Mr. King found that the deficiency of children under one in the census of 1880 amounted to 3.62 per cent, and in 1890 to 23.72 per cent of the number reported.[4] These proportions are equivalent to 3.5

[1] See Massachusetts Registration Report, 1880, Appendix, p. clxix.
[2] p. 5.
[3] See Massachusetts Registration Report, 1880, Appendix, p. clxxvi.
[4] In addition to an allowance for omissions in the registration of births.

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per cent, and 19.2 per cent of the total estimated number. Thus, by Mr. King's figures, the percentage excess of the deficiency in 1890 over that in 1880 is 15.7. By the rougher method of comparison used in the present study it has been found to be 15.8 per cent. For the States of Rhode Island and Connecticut we have found that the deficiency of children under one in 1890 in excess of the deficiency in 1880 was very close to 10 or 11 per cent. Assuming for the present that this deficiency cannot be explained, even in part, by more complete registration of births, we subtract 10 per cent from the 15.8 per cent deficiency of the Massachusetts census and have left less than 6 per cent to be explained by improvement in the registration statistics. The fact that the comparisons of the 1890 returns with the returns of earlier censuses, in which the age question was asked in the same manner, show no deficiency in the later census is very strong evidence that the 10 per cent deficiency found in the Rhode Island census of 1885 and in the federal census of 1890 in Rhode Island, Massachusetts and Connecticut is chargeable to the form of the age question. That the number reported as one year old in the States considered, is in excess fully as much as the number reported as under one is deficient, is a strong confirmation of this explanation. If we accept the conclusion that the change in the form of the age question caused the over-statements of the ages of children under one in 1890 to exceed the similar misstatements in 1880 by about 10 per cent of the number of children at that age, the census figures and the registration returns are brought into harmonious relation. This percentage does not measure the total deficiency in 1890, however, but only the excess over the deficiency in 1880, which, Mr. King found, was for Massachusetts about five per cent. But Mr. King assumed that the omissions in the registration of births were in 1880, as in 1890, about two per cent. We have seen that the registration was much more

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complete in 1890 than in 1880, the difference being sufficient to make the total deficiency in the census returns of children under one in 1880 nearer 10 per cent than 5.

Whether such a deficiency is too large to be entirely explained by over-statement of age cannot be determined. The over-statement of the ages of children under one in 1870 must have been considerably greater than this, but the census of 1880 was taken with much more care than the census of 1870. It is certain, however, that a considerable part of this deficiency was caused by over-statement. Altogether, our evidence goes to show that a very small part of the apparent deficiency of children in 1890 was caused by omissions in the enumeration. There undoubtedly were some omissions of children, but it cannot be shown definitely that these omissions were proportionately more numerous than the omissions of adults. Neither is it probable that these omissions were more numerous than in previous censuses.

European experience with reference to the omissions of children in the census is instructive. After the latest Italian census (that of 1881) was taken, the age returns were subjected to careful study. A comparison of the number of children enumerated by the census with the number estimated on the basis of the registration of births and deaths, showed a deficiency in the census reports of children under one of 1.5 per cent. The deficiency in the reports of children one year old was nearly as large (1.4 per cent), but for children two years old it dropped to 0.2 per cent, while for children three and four years old the census figures show a slight excess.[1] In the Italian census the persons enumerated were asked both the date of birth and the age at last birthday. It seems probable that the deficiencies noted were due to omissions in the enumeration.

More conclusive are the results of a similar comparison made for the Berlin census of December, 1890. Each instance

[1] *Annali di Statistica*, 1885, "Sulla Composizione della popolazione per Età," pp. 11-17.

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of an apparent omission in either the census or the registration reports was the subject of a special investigation. The study was necessarily limited to the two months preceding the taking of the census. It was found that 53 children born in October, and 167 born in November were omitted in the enumeration.[1] These omissions amounted to 2.8 per cent of the total number of children less than two months old; but the fact that omissions of children one month old were much less frequent than of children less than a month old indicates that the percentage of deficiency in the returns of children less than 12 months old was considerably less than 2.8. The results of other European censuses give evidences of similar omissions.[2]

It may be added that such authoritative writers as von Mayr and Levasseur are in agreement as to the fact of census omissions of children. To quote the former: "A source of confusion in age statistics . . . lies in the omission of a considerable number of young children and infants in the enumeration."[3] Levasseur calls attention to the small number of children reported in the French census, and adds that "these results are not exact, because of faults in the census, which has omitted many young children."[4]

In view of this general omission of a small percentage of children in European censuses, it cannot be supposed that the United States census has been free from such faults, especially as our system of enumeration is admittedly more imperfect than those used in the European censuses.

[1] *Die Bevölkerungs- und Wohnungs-Aufnahme vom 1. December, 1890, in der Stadt Berlin*, p. 8.

[2] *Cf.* the age studies of the Swedish census of 1890 (*Bidrag till Sveriges Officiela Statistik*, (*A*) *Befolknungs-Statistik*, Ny foljd, xxxii: 3, xi-xii), and of the Hungarian census of 1891 (*Ergebnisse der in den Ländern der Ungarischen Krone am Anfange des Jahres 1891 durchgeführten Volkszählung*, I. Theil, 126.) For discussions of the omissions in the French census, see *Resultats Statistiques du Dénombrement de 1891*, p. 209.

[3] G. von Mayr, *Statistik und Gesellschaftslehre*, II, *Bevolkerungs Statistik*, p. 75. For an earlier expression of Dr. von Mayr's conclusions on this subject, see *Zeitschrift des königlich bayerischen statistischen Bureau*, 1869, p. 2.

[4] E. Levasseur, *La Population Française*, II, p. 264.

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Summary of Conclusions.

1. The apparent deficiencies in census reports of children are caused by omissions in the enumeration and by over-statement of age; the latter cause being by far the more important. The omission of a small proportion of children in the enumeration is a matter of general census experience, while over-statement of the ages of children seems to be a fault peculiar to those censuses in which the age is obtained by direct question as to the number of years lived.

2. These two causes of deficiency were operative in the United States censuses of 1880 and 1890. It is probable that the increased deficiency of children under one year of age, in 1890, was caused by an increase in the over-statement of ages. There is no trustworthy evidence of an increased omission of children in the census of 1890.

3. It is difficult to measure the absolute deficiency of children in either 1880 or 1890. What evidence we have points toward a probable excess in the deficiency of children under one year of age in 1890 over that in 1880, amounting to about 10 per cent of the total number. If Mr. King's estimate of a 20 per cent deficiency in 1890 is near the truth, the deficiency in 1880 must have been approximately 10 per cent.

4. The increased over-statement of children's ages in 1890 was caused by the change in the age question from "age at last birthday," to "age at nearest birthday," and does not necessarily indicate that the enumeration was less careful than in previous censuses.

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MISCELLANY AND NOTICES.

FUNCTIONAL HEALTH OF WOMEN.

The American Girl of Today. By Geo. J. Engelmann, M.D. President's Address American Gynecological Society, Washington, D. C., 1900. *American Journal of Obstetrics*, vol. xlii, No. 6, p. 44.

The purpose of this paper is the study of the conditions which interfere with a healthy performance of the female function during the great waves of sexual life; and particularly the effect of school and college life npon that function. Puberty, menstruation, labor and the menopause are the undulations which characterize the functional life of woman. The investigations of Mayer, De Boismont, Joulin, Weber and Radzewitch have shown that wealthy and city-born women are more precocious functionally than poor women or country women. The average age at which menstruation begins in the American born woman is 14.3 years, as shown by Dr. Emmet, Dr. Chadwick of Boston, and as corroborated by Dr. Engelmann from 6549 cases in the southwestern States. Working girls of Boston attain puberty at 14 years, High and Normal School girls at 13.8, and college girls at 13.5.

Susceptibility to infectious and fatal disease is reduced to a minimum, and mortality is at its lowest in the pre-pubertal period, as shown by the U. S. census and by data from Hartwell and Bowditch charted by the author. Data from Danish schools collated by Axel Key indicate that while mortality is lowest, morbidity and life intensity are highest just preceding the beginning of menstruation.

Anatomical, physiological and pathological facts demonstrate that the wave of the pubertal period and of the menstrual function are similar in kind, varying only in degree. The activity of every function with the exception of nerve excitability, is intensified before the appearance of the flow. During pregnancy and labor there are similiar conditions, but this wave is of longer duration and of greater intensity. The investigations quoted are sufficient to demonstrate that the waves of the pubertal and menstrual period are identical

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in their causes and results and are accompanied by a disturbed equilibrium of the entire system.

In view of these facts it is important to study the conditions under which the functional life of American girls between 15 and 26 years develops. The importance of the inquiry is indicated by the presence of 374,487 young women in colleges and high schools and of probably over one million under 20 years of age in the industries.

Dr. Engelmann's records of 4873 cases of young women during adolescence, with their previous menstrual history, suggest the following conclusions: That physical conditions and nerve influence have a marked effect upon the *regularity*, *frequency* and *amount of accompanying pain*, both direct and reflex, of the menstrual period. The effect of mental strain and application is evident in increased frequency, while change of conditions and surroundings delay the appearance of the flow, as shown by the reports of different schools. In the freshman year at college there is greater irregularity, with marked infrequency due to violent change of habits and surroundings. The strain of examinations, mid-years and finals, is registered, either in a greater frequency or in retardation, more frequently the latter, but always in irregularity. Irregularity is found in over 50 per cent of those in school and college. While retardation appears to characterize college life, greater frequency characterize normal school life. Physical training appears to regulate favorably to a certain degree both frequency and duration.

Severe suffering exists in from 11 to 18 per cent of all cases and some discomfort in from 30 to 95 per cent. Greater suffering is found among business women, varying from 78 to 91 per cent, depending on the kind of business. In general, the percentage of suffering is greater in the more advanced classes of schools and colleges, but a certain number record better general health and that severe suffering grows less. In the working girl, however, severe suffering increases. All cases report increased difficulty of work, both mental and physical, during the menstrual period, — the working girl again suffering most.

While from 14 to 30 per cent are habitually or occasionally excused from study or work at this time, fully 50 per cent continue pleasurable exercise, such as dancing, wheeling and skating, while some even follow active sports. This perhaps more than the strain of mental work increases suffering.

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Charts V, VI and VII, collated wholly from foreign data, show the distinct relation of morbidity, *i.e.*, of minor ailments, to the time of first menstruation and the increase of morbidity with increase of hours of study.

Dr. Engelmann's own contribution to the subject appears to be a statistical corroboration of the fact, long accepted by physicians and educators, that young unmarried women suffer an extraordinary degree of pain and discomfort from the menstrual function; that they are seldom habitually well, and that this is true, though in varying degree, both of girls at schools and of girls at work. He shows that the only significant reduction of the percentage of suffering appears in those who have a large amount of gymnastic exercise.

The entire absence of any mention of the effect of change of climate on the menstrual function seriously obscures his results. The resident physicians in charge of young women in colleges are accustomed to attribute a large part of the irregularities of function in freshmen to this cause. This view is corroborated by the common experience of women who travel abroad or to any widely different climate. A large proportion of college girls and of girls in boarding schools and normal schools experience a considerable change of climate in coming away from home, while the high school and working girls, noted in the totals, probably do not suffer this particular element of disturbance. The return to a normal period in vacations, mentioned by Dr. Engelmann and noted by all observers, may be quite as much due to a return to the home climate as to the cessation of mental application.

Again, race differences are wholly overlooked in the use of the phrase "American born." The native American girl of several generations of New England ancestry will probably give a very different menstrual history from that of the native born of Irish, German, Italian or Slavic parentage. Working girls of peasant ancestry should presumably suffer less menstrual discomfort.

To establish the injurious effect of mental application on the menstrual function, it would be necessary to compare through a sufficiently long period, the menstrual habits of young women of the same average age, in the same climate, of the same general race constituency; the one set in school or college, the other in social and domestic life. Dr. Engelmann has only corroborated a mass of testimony as to the general discomfort of young women of two general

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classes; he has not differentiated the factor of mental application from that of clothing, physical inactivity, mal-nutrition, nor from hereditary causes. All of these have been emphasized by many investigators as producing pathological conditions in women.

Amenorrhea and dismennorrhea, due to violent emotion and to physical causes, particularly cold and excessive fatigue, are frequent phenomena in the lives of women of all classes and ages, both in and out of school, both married and unmarried — at least in the United States. It would seem that a statistical analysis of these interacting conditions, to show their relative weight in producing menstrual disturbance, would be the most important contribution which could be made at the present moment to the physiology and hygiene of women.

Dr. Engelmann suggests, but does not sufficiently emphasize, that deterioration in menstrual health is a "sequence of college life, directly and indirectly, not due altogether to undue strain, but to the combined influence of habits of life and methods of training" (p. 787). .... "That pupils in the Normal School for physical training should appear with 71 per cent (of suffering) would seem inexplicable as these are young women under the best possible conditions, with an apparently most favorable combination of mental and physical work" (p. 779).

A few quite untenable statements show a lack of intimate knowledge of girls' school life; for instance, that "studies are not pursued with too great vigor in the freshman year at college" (p. 775); and (p. 779) that "girls already broken down frequently undertake this course (in Normal School) for the purpose of restoring health wrecked in previous occupations." This latter statement may be true of a particular normal school, but is certainly not generally true of that class of schools.

Some statistical tables are defective (p. 776), because of absence of numerical basis of this class exhibited; others (p. 778), because the classes to be compared are not averaged together after being presented in order of percentage importance. The remedial suggestions, though not new, are valuable because based upon so large an amount of experience and such a variety of data, both European and American.

Dr. Engelmann emphasizes especially the value of physical training. He further offers the preventive solution in "reasonable hours

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of study; in mental training adapted to physiological possibilities, and a regard for woman's sensitive organizations." He properly emphasizes as the first step toward betterment, "knowledge of woman's functional life,— by physician, educator, and mother, and by the girl herself."

MARY ROBERTS SMITH.

MONTHLY BULLETIN OF THE STATISTICS DEPARTMENT OF BOSTON.

Reviews of the special reports in *Bulletins* 1 to 9, vol. i, may be found in the December, 1899, number of the *Publications;* notices of reports in *Bulletins* No. 10, vol. i, to No. 8, vol. ii, appeared in the issue of September, 1900.

VOL. II, NO. 9, SEPTEMBER, 1900.

This bulletin contains two articles in the appendix: (1) "Tax-Rates of Massachusetts Cities, 1880–99," and (2) "Analysis of Loans Issued, 1893–94 to 1897–98."

(1) *Tax-Rates of Massachusetts Cities, 1880–99.* — Three tables show the annual tax-rates of all the cities of Massachusetts, from 1880 to 1899, the variations in these rates, and the average tax-rates of all cities for periods of five, ten, and twenty years.

The following table is a summary of the table showing the *Variations of Tax-Rates of the Cities, 1880–99:* —

Tax-Rate.	One-Year Periods.			Five-Year Periods.				Ten-Year Periods.		Twenty Years.
	1880.	1890.	1899.	1880–84.	1885–89.	1890–94.	1895–99.	1880–89.	1890–99.	1880–99.
Over $19...	6	1	7	20	8	4	17	28	21	49
$18 to $19..	2	..	4	17	17	12	22	34	34	68
$17 to $18..	3	6	8	19	27	28	40	46	68	114
$16 to $17..	6	6	7	33	34	34	38	67	72	139
$15 to $16..	7	7	4	29	24	43	25	53	68	121
$14 to $15..	4	7	..	19	21	22	4	40	26	66
Under $14..	4	5	2	23	29	17	14	52	31	83
Total Cities	32	32	32	160	160	160	160	320	320	640

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This table shows (1) the general decrease in the tax-rate from 1880–90 — when there was, with one exception, no one of the 32 cities with a tax-rate greater than $18, while 60 per cent were below $16 — and the marked rise in the rate, in 1899,— when the average became $17.26, only 2 cities of the 32 having a rate less than $15; (2) the gradual movement of the majority of the cities from the limits of $15–$17 in 1880 to $14–$17, a degree lower, in 1890, and then to $15–$18, two degrees above that, in 1899,— accompanied by a steady decrease in the number of cities having rates below $15; and (3) the collection and centering of the cities, when considered for the whole 20-year period, about the $16–$17 division, with the outside cities about evenly divided above and below.

(2) *Analysis of Loans Issued, 1893–94 to 1897–98.* — This table shows, with summary, the amount of loans issued in each fiscal year, and their terms, rates of interest, and relation to the debt limit. The total of loans issued in each of the years is as follows: —

1893–94,	$5,558,325
1894–95,	6,655,300
1895–96,	6,793,850
1896–97,	8,274,800
1897–98,	8,627,600

For the first three of the years, the larger part of the loan was made for a 20-year term, at 4 per cent; but in the latter two years, the larger part has been for terms of 30 and 40 years, the rate falling to 3½ per cent. The proportion of the loan *outside* of the debt limit was 44 per cent in 1893–94, 41 per cent in 1894–95, 52 per cent in 1895–96, 65 per cent in 1896–97, and 62 per cent in 1897–98.

VOL. II, No. 10, OCTOBER, 1900.

Two studies are contained in this bulletin: (1) Distribution of Population, by wards, in Boston in 1895 and 1900; and (2) Boston School Census, 1900.

It appears that the growth of the immediate encircling suburbs of Boston was 4.07 per cent greater than that of the city itself in the period 1895–1900; and was 14.34 per cent greater in the period 1890–1900.

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VOL. II, NO. 11, NOVEMBER, 1900.

This bulletin contains two reports: (1) Boston Elections, 1890–99; and (2) Boston School Census, 1896–1900.

(1) *Boston Elections, 1890–99.*— Three tables give election statistics for each year of the decade, showing (*a*) the possible vote, (*b*) the actual vote, (*c*) the per cent of actual to possible vote, and (*d*) the relative per cent on a scale of 100, as regards the elections held for President, Congressmen, Governor, Mayor, Street Commissioner, School Committee, and City Council, together with the votes on license and questions submitted to referendum. For the sake of comparison, a table has been included, to show the election figures for President, Congressman, Governor, Street Commissioner, and School Committee, in 1900. In the calculation of the "relative per cent," the mean per cent of actual to possible vote for President for 10 years has been taken as 100. The relative interest in elections, 1890–99, is thus shown to be for President, 100.00; Mayor, 91.78; Congressmen, 91.05; Governor, 88.69; and School Committee, 74.36. The mean per cents of actual to posssible vote, 1895–99, are shown to be for Mayor, 80.12; Street Commissioner, 71.36; on License, 69.23; for Aldermen, 68.43; Councilmen, 67.52; and School Committee, 62.80. With the exception of the election for Mayor, the voting during the decade has shown a falling-off of interest, when the period 1890–94 is compared with the period 1895–99. In the gubernatorial elections, the relative per cent was for the first period 95.49, and for the second only 82.97.

VOL. II, NO. 12, DECEMBER, 1900.

This number contains summary tables for the year, presenting the combined results of the monthly statistics presented by the Bulletin during the year Also, there is included a special study entitled an *Analysis of Votes on Referenda, 1890–99*, in Boston. A table shows for each year the nature of the question referred, the character of the election at which it was submitted, and the possible and actual votes, with the per cent of actual to possible vote and the relative per cent on the scale of 100, the base for this last per cent being the same as used in the study on *Boston Elections* in the Bulletin preceding. In the five years, 1895–99, the mean per cents of actual to

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possible vote were: on all Referenda, 67.53; on License, 69.23; on other questions, 66.31; as compared with 80.12 for Mayor, 68.43 for Aldermen, and 62.80 for School Committee.

E. H. D.

ECONOMIC STATISTICS.

The *Bulletin of the International Institute of Statistics*, Vol. XII, No. 1, contains a series of nineteen reports on statistical subjects, presented during the meeting held at Christiania, in September, 1899. Among these is a short article on "Comparability of Trade Statistics of Various Countries," by A. E. Bateman, Comptroller-General of the Commercial, Labor, and Statistical Departments of the Board of Trade. This contains a series of tables, etc., showing generally the present practice in Europe and America with regard to (1) the method of registering imports and exports; (2) the method in use for arriving at the values of such imports and exports; (3) the various systems of classifying the different categories of imports and exports in use in each country; and (4) the methods of dealing with articles in transit, and the temporary importations into each country. The last topic is considered quite fully in the paper.

There are also two papers by Mr. P. G. Craigie, Director of the Intelligence Division of the Board of Agriculture, London. In a "Memorandum on the Methods Employed in Collection of the Annual Agricultural Statistics of Great Britain" he tells of the work done in collecting statistical data on area and live stock by the officers of Inland Revenue of London, describing the blanks used by them and the general method of tabulating results. In regard to produce estimates, he speaks of the system followed by "estimators" in their preparation and compilation of information. The second article by Mr. Craigie is entitled "International Comparisons of Cattle and Sheep on the Surface Areas." In this article tables are presented giving the aggregate number of cattle and sheep in a number of countries for 1869 and for the present time. In these tables he has contrasted the showing of twenty-seven countries; thirteen European states, thirteen separate colonies of Great Britain, and the United

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States. Assuming a constant superficial area for each of the places, and considering the number of the live stock per 1000 acres of surface, Mr. Cragie notes a clear increase in cattle and decrease in sheep. In nine European states the population has grown, from 1869 to 1898, from 140,000,000 to 173,000,000 persons, nearly 24 per cent increase, while the cattle have increased about 21 per cent, from 48,000,000 to 58,000,000, and the sheep have been reduced by 28 per cent, from 104,000,000 to 75,000,000. In the United States, the population increase in the same period has been 89 per cent, the cattle having increased from 25,500,000 to 44,000,000, a rise of 73 per cent, and the sheep having become fewer by 2,000,000 head.

Another article is a statistical contrast based on a study of "Wheat and Maize Production in the United States," by John Hyde, Statistician of the United States Department of Agriculture, and Editor-in-chief of *The National Geographic Magazine* of Washington. Mr. Hyde calls attention to the remarkably wide territorial limits within which maize is cultivated. Over half of the total maize crop is produced in four States, on less than one-tenth of the entire area of the country, yet there is a production of at least one-tenth of a bushel to every acre of land surface, the crop averaging in the last ten years 1,850,000,000 bushels per year. Yet this production is capable of indefinite expansion. A history of the relative production of wheat and maize in the United States is given; and Mr. Hyde says, "Despite the fact that wheat, like cotton, is the principal ready-money crop throughout a vast extent of territory, and notwithstanding, too, that it is a commodity of the world's markets and that there is a foreign purchaser for one bushel in every three against one in every twenty in the case of maize, wheat is not only much less extensively grown than maize but the disproportion in the acreage devoted to the two products is steadily increasing," Maize owes its commanding position in American agriculture to a marvelous capacity for adapting itself to the most varied conditions of soil, climate, and cultivation. Wheat is completely overshadowed, with all the prospects of being rendered still more unimportant as the maize increases in productive importance.

Monsieur A. de Foville, Directeur des Monnaies de France, presents an article on "La Statistique Internationale des Monnies et des

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Métaux Précieux." This summarizes the first four volumes (1896, 1897, 1898, and 1899) of the newly published *Rapports du directeur de l'administration des monnaies de France.* The volumes are between 300 and 400 pages each, and are divided into four parts. The first part contains a series of statistical and general legislative documents concerning France and her colonies, reports showing the movements of the money in France, and a synopsis of all important monetary acts and amendments in that country The second part treats similarly the financial history of the other states of the Latin union. The third part considers all other countries in the same way, in so far as the comprehensiveness of the published financial statistics of each country will permit. The fourth part, entitled "Statistiques Générals," summarizes the information for the entire world; giving the production of the precious metals, the coinage of gold and silver, financial stock, and the industrial manufacture of silver and gold. The report for 1899 contains the result of the investigations of a special commission instituted at Berlin for the purpose of determining the amount of gold coin that is used, each year, in the manufacture of artistic or industrial articles. The volumes are illustrated by various diagrams, plans, and pictures. In describing this publication, M. de Foville gives briefly the history of the work and a short though critical analysis of the method employed by him in the performance of the extensive editorial and statistical duties connected with it.

E. H. D.

STATISTICS OF PAUPERISM.

Table IX of the *Report of the State Board of Charity* for 1901 is a new one. It differs from any that have previously been given by the Board, chiefly in the fact that the settlement question has been eliminated. Hitherto the story of the increase or decrease of relief and support of the different classes of paupers has been difficult to follow in the statistical tables, because the student has had to read it through the obscuring medium of the settlement law, and has never known, without comparing a number of tables, whether to attribute variations in a given column of figures to changes in that law or to

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changes in the actual number of persons receiving support or relief. The present table shows the yearly cost of pauper relief in Massachusetts from 1878 to 1900, inclusive, separated into the main headings of full support, partial support (chiefly outdoor relief), administrative expenses, and vagrancy.

The cost of full support is divided into the cost at almshouses, at insane hospitals, and elsewhere. In addition there are given columns showing the average weekly cost at almshouses and insane hospitals and elsewhere, and the average weekly amount of partial support, also columns showing the cost to each inhabitant of the Commonwealth of full support, partial support, and both together. Room is also found for columns showing the number of persons receiving full support and partial support respectively, and the number of cases of vagrancy.

The "demnition total," which is what the average man is most interested to know about, has risen considerably, especially in the years 1895 to 1900 inclusive. In 1878 it was ninety-seven cents per inhabitant of the State; in 1884 it had risen only to $1.04. The next year it jumped to $1.15, but in 1894 it was still only $1.07. In 1895 it was $1.18, and in the last three years it has increased up to $1.26 for 1900. Until the board has applied their new method in statistics to the number of persons supported and relieved from year to year so that one can tell the percentage of the population represented by each class of paupers it will be difficult to easily ascertain wherein the increase in expense has occurred, how far it is due to increase in numbers, in what classes of paupers this increase has occurred, and how far it is due to increased care.

The present figures show that the average weekly cost at almshouses increased from $1.98 in the year 1880 to an average of about $2.30 ever since, although in 1900 it was as high as $2.47. The average weekly cost at insane hospitals reached its highest, $3.81, in 1887. In 1900 it was $3.38. it is gratifying to see that the average weekly amount of what is practically outdoor relief has risen from sixty-two and a half cents in 1878 to ninety cents in 1900. while the number of persons so relieved has fallen from 23,000 in the former year to 19,000 in the latter, a decrease, however, which seems to have taken place chiefly in the year 1880.

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THE RATIO OF PHYSICIANS TO THE POPULATION.

The following article appeared in the *Boston Medical and Surgical Journal*, January 10, 1901: —

Recent publications present an opportunity to learn the relative number of physicians to the population in the United States and in Germany, with a fair degree of accuracy, and to compare these numbers in the different States with each other.

Dr. Abbott's recent monograph, which was prepared for the Paris Exposition,[1] contains a table, the basis of which is "Polk's Register of Physicians in the United States." The relative figures were determined by comparing these figures with the population of each State as estimated for 1898, and may be considered as fairly correct, with the exception of Oklahoma and one or more new States in which the rate of increase was out of all proportion to that of former years.

The publication of a later edition of the *Register* in 1900 makes it possible to present a more accurate table, based upon the recent census of 1900. From the following table it would appear that either the old aphorism that 1000 inhabitants are required for the support of the average physician must be considered as out of date, or a large proportion of the profession are not earning a living, since the average for the United States at large, as shown in the following table, is 1 physician to each 655 inhabitants. Moreover, the large annual product of the medical colleges is constantly tending to diminish this number of inhabitants to each physician.

An examination of the following table shows that California is the State which is most liberally supplied with medical men, the proportion there being 1 physician to 416 inhabitants, and the ratio in Colorado and Vermont is about the same, while the States which are the most sparsely supplied are South Carolina, North Dakota, North Carolina, New Mexico, and Alaska, with, respectively, 1 to 1123, 1132, 1189, 1395, and 2349 inhabitants.

These conditions are clearly illustrated for the year 1898 by means of a chart in the pamphlet referred to. The two tables for 1898 and 1900 do not present very striking differences except in the States of Iowa, Kansas, and Nebraska, the reasons for the difference being

[1] The Past and Present Condition of Public Hygiene and State Medicine in the United States; being No. 19 of the Monographs on American Social Economics, prepared for the Paris Exposition of 1900.

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NUMBER OF INHABITANTS TO EACH REGISTERED PHYSICIAN, 1900.

Name of State.	Number of Inhabitants to Each Physician.	Name of State.	Number of Inhabitants to Each Physician.
California	416	Delaware	694
Colorado	452	Nevada	706
Vermont	469	Oklahoma	707
Ohio	489	Nebraska	725
Indiana	494	Idaho	749
Missouri	507	Florida	751
Arkansas	546	Arizona	754
Kansas	555	Washington	762
Tennessee	556	Georgia	767
Maine	556	Montana	782
Massachusetts	561	Virginia	842
Illinois	562	New Jersey	856
New Hampshire	564	South Dakota	894
Maryland	565	Alabama	930
Michigan	570	Wisconsin	936
Indian Territory	597	Utah	944
New York	603	Wyoming	964
Iowa	609	Louisiana	985
Texas	612	Minnesota	1,004
Kentucky	625	Mississippi	1,027
Oregon	638	South Carolina	1,123
United States	**655**	North Dakota	1,132
Pennsylvania	662	North Carolina	1,189
West Virginia	667	New Mexico	1,396
Connecticut	687	Alaska	2,349
Rhode Island	692		

apparently due in the two former States to an unusual increase in the population, and in the latter to an unusual increase in the number of physicians.

Turning now to Germany, an entirely different condition is evident, as shown by the recent publication of the Imperial Board of Health of the German Empire.[2] In that country, three enumerations of the physicians have been made at intervals of eleven years; one in 1876, one in 1887, and the last in April, 1898. The last enumeration was very comprehensive, and included all persons employed in connection with the care and treatment of the sick, either in private practice or in hospitals or other institutions. The circular calling for information was issued by the Imperial Board of Health of Germany, and included the enumeration of the following persons: —

[2] Medizinal-statistische Mittheilungen aus dem kaiserlichen Gesundheitsamte, Bd. vi, H. 1, Berlin, 1899.

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Regular practicing physicians: (*a*) Physicians in private practice; (*b*) physicians in institutions; homeopathic physicians; military and naval surgeons; other "approved" practitioners, including surgeons and country doctors; dentists; dentists' assistants; nurses, masseurs, etc.; veterinary surgeons, civil and military; midwives.

The foregoing are still further classified quite minutely.

Two excellent maps are also presented, showing the distribution of physicians in the German Empire.

In the empire at large the number of physicians had increased from 15,284 in 1887 to 24,725 in 1898, or more than 56 per cent, while the population had increased only 14 per cent. This last enumeration shows that the ratio of the number of physicians to the population in Germany is very much less than that which prevails in the United States, since in the German Empire there was in 1898 only 1 physician to each 2114 inhabitants, while in the United States at the same time there was 1 for every 647 inhabitants.

The German documents also give a further classification in detail according to the density of the population of 1005 districts.

In districts having more than 20,000 (cities), the number of the physicians had increased from 6648 in 1887 to 12,651 in 1898, or 90 per cent, the population increasing meanwhile only 48 per cent.

In districts having from 5000 to 20,000 inhabitants, the number of physicians had increased from 3295 to 4256, or 29 per cent, the population increasing only 19 per cent.

In the smaller districts having less than 5000 in each, the physicians increased in the eleven years from 5881 to 7818, or 33 per cent, while the population remained nearly stationary.

The number of homeopathic physicians in the German Empire is stated as 240, or less than 1 per cent of the whole number of practitioners.

The veterinary surgeons were 3813 in number, and are compared with the class of patients whose ills they are called upon to treat, there being in the German Empire 1 veterinary surgeon to every 1240 horses, and 5677 head of cattle.

An examination of the maps and accompanying tables shows that both physicians and midwives are distributed most liberally in Bavaria and the districts along the Rhine, while the districts which are most sparsely supplied are those of Northeastern Prussia and the Russian border.

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AMERICAN

STATISTICAL ASSOCIATION.

I. SOME STATISTICS OF RECIDIVISM AMONG MISDEMEANANTS IN BOSTON. By John Koren.

II. MISCELLANY AND NOTICES: The Fifty-Eighth Registration Report of Massachusetts, *C.-E. A. Winslow;* Notes on Vital Statistics, *C.-E. A. Winslow;* Statistics of Berlin, *S. W. A.;* Government Annuals and Periodicals, *L. P. Lane.*

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CONTENTS.

I. Some Statistics of Recidivism Among Misdemeanants in Boston. *By John Koren.* 271

II. Miscellany and Notices: —

The Fifty-eighth Registration Report of Massachusetts. *C.-E. A. Winslow.* 310

Notes on Vital Statistics. *C.-E. A. Winslow.* 314

Statistics of Berlin. *S. W. A.* 332

Government Annuals and Periodicals. *L. P. Lane.* . . . 334

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AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, No. 54. JUNE, 1901.

SOME STATISTICS OF RECIDIVISM AMONG MISDEMEANANTS IN BOSTON.

By John Koren.

The existence in this community of a numerous class of misdemeanants, men and women, who not infrequently begin and generally end their earthly career in some public institution, is painfully evident. They infest the minor courts like a plague and swarm in the prisons. When the cold of winter, or sickness, or old age comes upon them, they flock to the almshouses. They are constant beneficiaries of medical charity both within and outside hospitals and asylums. In largest part they subsist upon some form of public bounty, not by labor. Some are distinctly of a criminal type and have criminal records in various penal institutions. Others belong to the rounder class, while still others have but one institution home — the house of correction. All, however, have this in common that they are inebriates of a pronounced type.

What to do with these misdemeanants, and what to do for them, are questions which daily perplex the courts, heads of institutions and other officials. Our knowledge concerning them is very inadequate. Even their number in this city can only vaguely be approximated. Neither has much effort been made to ascertain the results of present methods of dealing with this class, in order to determine whether these

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methods are at fault and in some part responsible for its perpetuation. These unfortunates have been with us so long that we have almost come to regard them as unavoidable elements in our social order; and, for the greater part, we have been content to deal with them according to long established practices without inquiring into results.

The above is a brief characterization of a phase of the misdemeanant problem as it is observed in Boston. The main factors in the problem are found, however, in all populous centres throughout the United States. No large city can boast absolute freedom from the criminal or non-criminal inebriate, the vagrant, the rounder, or whatever name may be given to the anti-social being who is constantly at war with public order, and does not stop at offences which injure the person or property of others. The chief difference is that one community may in a sense make light of the matter by permitting numerous petty offenders, particularly inebriates, to escape without punishment except in graver cases. Under very lenient or laxly enforced laws, it happens in some cities that the larger number of misdemeanants is practically left to shift for itself, with a minimum of police interference, while in others they are constantly brought before the courts because public sentiment demands the employment of severer measures.

Thus, although misdemeanants are found in fairly equal proportions in the large cities, and the problem of dealing with them is common to all, the public recognition of it as such varies greatly. The whole question becomes much accentuated in a community where constant effort is made to apprehend and in some way dispose of all misdemeanants. Moreover, the presence of a large recidivistic class of these offenders only becomes apparent in proportion to the efforts made to separate them from the rest of society and to apply corrective means. Conditions in Boston furnish an illustration in point. Its very high rate of arrests for minor offences

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is due principally to the wholesale apprehensions for drunkenness which, together with crimes immediately resulting from intoxication, form the bulk of misdemeanors. With exception of those guilty of public drunkenness, which Massachusetts law defines as a crime, misdemeanants are not much more severely punished than elsewhere, unless they are known to be old offenders. Not only does the law require a distinction in the treatment of first and habitual offenders, but special effort is made to separate the two classes. The daily grist of the courts undergoes a sifting process at the hands of the probation officers whose duty it is to inform the judges with regard to previous arrests and convictions. While the recidivistic group of misdemeanants becomes more clearly defined through the stricter investigation prior to trial, it does not follow that it is relatively larger in Boston than in other cities, or of a materially different type. It should also be remembered that the methods and processes of dealing with misdemeanants, whether it be in New York, Chicago or San Francisco, do not diverge in essentials from those obtaining in Boston. If, therefore, the investigation had been extended to these or other cities the resultant facts would probably have been in very close correspondence.

The importance of the misdemeanant problem is generally underestimated. Time, treasure, and talents are poured out unstintingly in the improvement of methods dealing with felons, with little concern for the petty offenders who are a far greater menace to society, and from whose ranks the felon class is largely recruited. The drunkard, the idle and disorderly, the vagrant, the tramp may not so obviously imperil our person and property, but as their number is greater so is the waste produced by them infinitely greater than that of all thefts and burglaries; and they leave a larger inheritance of degeneracy, vice, and misery to coming generations.

The present investigation is not concerned with any theory in regard to the treatment of misdemeanants, much less with

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any general criticism of prevailing methods. It merely aims to supply some facts of record about a limited number of this class in their relations as public charges — facts which tell their own story, and may aid those who study them to a better conception of the problem involved, and to measure in some degree the value of the present ways of handling it by actual achievement.

As the statistics relate so largely to persons committed for drunkenness the following explanations may be helpful: —

In Massachusetts public drunkenness is punishable by a fine, not exceeding fifteen dollars, or by imprisonment in the local workhouse, not exceeding one year. A person guilty of this offence may, however, be sent to the State Farm or either of the reformatories on an indeterminate sentence for the maximum term of two years. For being a "common drunkard" a fine not exceeding twenty dollars may be imposed, or a sentence to imprisonment for not more than six months. Common drunkards may also be sent to the State institutions mentioned above for a term not exceeding two years. It is thus possible that the first offender may be punished more severely than the confirmed inebriate.

If there is no evidence to show that the prisoner has been arrested twice before within the preceding twelve months, he may be discharged without punishment. Or the offender may be placed on probation for a definite period regardless of previous arrests or convictions.

Although it is discretionary with the courts to specify a time within which the fine imposed must be paid, the failure to do so at once usually results in commitment for a period of from eight to thirty days, according to the amount of the fine. From July, 1891, to July, 1893, the fine was abolished; at other times it has fluctuated in amount, as shown on other pages, but with these exceptions the general character of the law has remained the same during the period covered by this study.

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In Boston commitments for drunkenness are usually to the House of Correction at Deer Island, which is also the chief institutional home of the recidivistic misdemeanants, although some of both classes are confined in the House of Correction at South Boston. Both of these houses of correction are Suffolk County institutions.

Limitations of the Investigation.

The great labor of tracing the records of individuals through huge registers of institutions for a period of 20 or 30 years made it necessary to limit the inquiry to a small number. It was, therefore, confined to misdemeanants who were committed to the House of Correction at Deer Island between July 1 and December 31, 1900, and who have records of a total of 15 or more commitments to that prison. They are not selected cases, but were taken up, one by one, in the order of their commitment. The statistics, then, relate only to living persons.

Primarily, it was sought to obtain all facts about their commitments to Deer Island. In most cases this has been accomplished. Yet knowing the common adoption of aliases wherewith to cover identity, especially at the beginning of a prison career, and the general difficulty of complete identification when thousands are involved, particularly after the lapse of years, during which there may have been many changes in the prison staff, it is more than probable that the actual number of commitments is larger than represented in our figures. No attempt has been made to learn the number of arrests which were not followed by subsequent commitment, or the number of convictions resulting in a fine which was paid in court, although we know, as will be indicated later, that many of our cases had court records before they were committed for the first time.

Next, it was sought to trace the relations of the cases to pauper institutions. Here again the baffling question of

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identity cropped up. Even greater difficulty was experienced in following known records in other prisons. The time and facilities at command made the inquiry in this direction very fragmentary. It was impossible to learn how many have received out door or other forms of relief, and to what measure. Of their family histories, we have only piecemeal information, and the fruitful subject of their mental and physical condition had to be left wholly untouched.

On the whole, the investigation deals with a fairly distinct group of misdemeanants — the confirmed and institutionalized inebriates. If it had been made to include persons with briefer and less continuous penal records, it probably would have related to a larger number of the distinctly criminal class from which felons are directly recruited. Although unavoidably fragmentary in part, the facts brought out furnish a complete illustration of certain phases of the misdemeanant problem. A larger number of cases would only have tended to multiply the somewhat monotonous array of facts without adding new information.

Summary of Results.

Our statistics deal with 140 persons, 100 of whom are men and 40 are women. Of the whole number, 109 are supposed to be residents of Boston, leaving 31 whose domiciles are in adjacent cities and towns, though the statements relied upon in this matter may be open to some doubt. Their present ages run from 25 to 75 years, no less than 23 being under 36 years of age, while but 33 are of maturer age than 55, which points to the comparative brevity of life among them.

Commitments and Offences.

The number of commitments to the record of each person shows a wide range — from a total of 15 to a total of 125, as appears from the recapitulation below.

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	Number of Commitments.									
	15–19.	20–24.	25–29.	30–34.	35–39.	40–44.	45–49.	50–59.	60–80.	More than 80.
Number of Persons...	43	37	9	15	10	5	6	8	5	2
Per cent.....	30.71	26.43	6.43	10.71	7.15	3.57	4.29	5.71	3.57	1.43

In no instance does the record of an individual cover a larger period than 30 years; most of the records date from the early eighties, but no less than 13 commitments are from a time subsequent to January 1, 1890, and one from as late as 1894.

The latter case (No. 77 in the appended table) shows it to be just as possible at the present time as during earlier periods to accumulate a record of 23 commitments in less than six years. In numerous instances the commitments practically form a continuous series from the date of the first, that is to say, they recur year by year with great regularity, leaving no ground for surmise as to commitments to other institutions. In not a few instances, sojourns in almshouses, hospitals, and other prisons cover much of the time the persons in question have been absent from Deer Island. Unaccounted-for gaps frequently occur in the records. Occasionally, probability points strongly to confinement elsewhere, but positive knowledge is lacking.

The number of times a person may have been committed during any period of twelve months depends largely upon the length of the sentence in each instance. All of the 140 persons have in some year been committed more than once, a majority more than four times, many five to eight times, and one has a record of 22 commitments in two years. The acme of achievement in this respect is represented by 16 commitments in less than twelve months (No. 139), which, so far as known, is unpararalleled.

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Offences.

The overwhelming number of commitments has been for drunkenness. In but seven instances do the combined commitments for other misdemeanors exceed those for drunkenness; in a few cases the numbers are nearly equal. No less than 33, or 23.57 per cent, have never been sent to Deer Island except for drunkenness, among whom are some with very long records. Although thus 103, or 73.57 per cent, have at some time been imprisoned for other misdoings than public intoxication, we find on inquiry into the nature of their offences that a large proportion may be fairly regarded as resulting from inebriety, such as assault and battery, disorderly conduct, disturbing the peace, breaking glass, vagrancy, etc. Oftentimes larceny does not so much indicate a propensity for stealing as a desire to get money for drink. This inference is corroborated by the fact that comparatively few were convicted for theft until they were far along on the road to hopeless inebriety. Not more than 31, or 22.14 per cent, were imprisoned for the first time for other offences than drunkenness. And again these other offences were mostly of the kind that spring from intoxication, namely, assault and battery, idle and disorderly conduct and disturbance of the peace and vagrancy, which constitute 25 out of 31 offences in question. How many had previously been punished elsewhere we have no means of knowing.

Age at First Commitment.

To 60, or 42.88 per cent, as will be seen from the grouping below, the doors of the Deer Island prison had swung open for the first time while they were still under 25 years of age; and of these, again, 43 had not yet attained their majority. The youngest age recorded is 15. In proportion just as many men as women were first committed while in their teens. Extreme youthfulness is more marked, however, among those committed for the first time between 1870

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and 1885 than among those who have not come before the courts, so far as we know, until a later period, although age apparently continues to be little heeded in meting out penalty. The fact that a few at the time of their first commitment were adjudged "common drunkards," makes it almost certain that they previously had been convicted and sentenced. In general, the age at the time of the first commitment to Deer Island does not necessarily indicate the period of life at which the public career of the offender was begun. Some of our cases, it should be remembered, are non-residents, others probably had prison records before settling in Boston.

	Age Periods.										
	15–19.	20–24.	25–29.	30–34.	35–39.	40–44.	45–49.	50–54.	55–59	Over 60.	Unknown.
Number of Persons	30	30	21	21	11	13	3	6	2	1	2
Per cent	21.44	21.44	15.00	15.00	7.85	9.28	2.13	4.29	1.43	0.71	1.43

Sentences.

Almost without exception, the sentences imposed from year to year upon the same individual exhibit a singular variety both as to kind and severity, no matter if conviction was for the identical offence. Only 27, or 19.28 per cent, were committed for the first time on a direct sentence to imprisonment, while 113, or 80.71 per cent, were confined for the first time because of inability to pay a fine, ranging from $1.85 upwards, but rarely exceeding $8. A sentence to pay a fine may be held equivalent to a judical declaration that neither the safety of the community nor the welfare of the offender demand his imprisonment.

In drunk cases the amount of the fine, as well as the length of the term sentence, indicate with a certainty that a num-

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ber had been arraigned at some time prior to their first commitment. For during the entire period covered by our records (with the exception of 1891–4, when the fine was abolished) the law regulating penalties for drunkenness did not permit the imposition of fines above a stated amount for the first offence within a period of twelve months, much less a term sentence to imprisonment for two months or more. Besides, as has already been mentioned, several of our cases were held to be common drunkards when first committed to Deer Island, which would probably not have happened had they been without previous court records.

The subsequent sentences do not disclose any uniform judicial policy in dealing with these misdemeanants. In 104 cases, or 74,28 per cent., the greater number of commitments were in each instance for non-payment of fines. The appended table discloses the extent to which sentences to pay fines have piled up. In some instances 16 out of 18 commitments, 40 out of 57, 28 out of 30, etc., were for non-payment of fines, the maximum being reached by case No. 140, who has been committed 96 times out of a total of 125 for inability to pay fines. It must not be understood that anything in the laws prescribed this frequent resort to a fine penalty, for the records show that in most instances the offenders had been committed more than once during the previous twelve months, and could thus lawfully have been made to suffer a much severer punishment. The use of either kind of sentence seems to have been a matter of accident, bearing no apparent relation to previous offences. Sometimes fines and term sentences are found to alternate with each new commitment. Again a period of years, during which more than one fine has been imposed annually, is followed by a period in which the option of paying fines was denied each time, and this, in turn, is relieved by a third period in which most commitments were for non-payment.

A few illustrations will serve to make the exceedingly important matter under consideration more intelligible. Case

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No. 119 has a record of 43 commitments since 1885, 42 of which were for drunkenness. From 1885 to 1891 he was sent to Deer Island 29 times for non-payment of fines, an average of about 4 per year, but the amount of each fine hardly varied. In 1891, the law permitting fines in drunk cases being abolished, he was sentenced a number of times to imprisonment until 1893, when the fine was restored. Since then fines and imprisonment have alternated, the last being a fine of $5.

No. 134 was committed 30 times for drunkenness between 1878 and 1887, in each instance for non-payment. Then, for the same offence, he was confined for 6 months, followed by 18 commitments for non-payment between 1887–1891. Subsequently he has spent 3½ years at Deer Island on term sentences, yet the last penalty imposed in 1890 was a fine of $10.

No. 113 was adjudged a common drunkard when first committed (1876) and sentenced to imprisonment for 3 months. Next year the same judgment and sentence were pronounced. From 1879–86, however, she was committed 16 times and invariably for non-payment. In 1887 she was sentenced to imprisonment for 12 months. This was followed by fines until 1890, since when she has been sentenced 7 times for periods from 2 to 6 months.

No. 124 had been committed 20 times for non-payment of fines before the privilege of paying was taken away. During the last five years the two kinds of sentences have been imposed in turn, with a seemingly studied regularity. That is to say, for the same offence he would have to remain in jail from 8 days to 9 months, accordingly as he was fined or not.

No. 121 began her career at Deer Island with 9 commitments for drunkenness in 1884, the first 8 of which were for non-payment. Then a term sentence was tried. From 1884–1891 she has in all been fined and neglected to pay 32 times.

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Once during this period she was sentenced to 2 months; once to 3 months, and once to 12 months' imprisonment. Later she has been fined, though not so frequently. The last sentence was for 4 months. With one exception, she has only been committed for drunkenness.

At the time of his first commitment (1870), when 19 years old, No. 136 was sent to prison for 6 months as a common drunkard, and again in 1871–'73–'75'–'77 and 1883, though the sentences varied in severity. But, in addition, he was fined from one to six times each year from 1871 to 1880 as a "simple drunk," which fines, of course, were never paid. In 1883 it was held advisable to give him a term sentence on account of his old failing, drunkenness, but for the next 8 years he was regularly fined one or more times each year. From 1891–97 only term sentences were imposed, but both in 1898 and 1900 he was fined $5 and in consequence escaped with a few days at Deer Island, although it did not happen to be his first offence within 12 months.

No. 60 is accredited with 21 commitments, all for drunkenness, yet has spent nearly 8 years at Deer Island. The first 8 times she was committed for inability to pay fines of $5 each. The ninth time she was sentenced for 6 months, but on the occasion of the next two offences was again given the option of paying fines. Again imprisonment was resorted to, this time for 4 months, succeeded later by two sentences to pay fines. Between 1892 and 1897, 5 sentences of 12 months each were imposed. No sooner was she at liberty at the end of 1897 than she got drunk again, but now a fine of $5 was regarded as a sufficient penalty. She could not pay and lived another month at Deer Island. For her last offence, in December, 1900, she was committed for 8 days, being unable to pay a fine of $3.

No. 139 was committed 74 times between 1875 and 1889, and 71 out of these for non-payment of fines, which in six instances amounted only to $1.85, yet he paid but part of one. In one year (1882) he was fined 15 times and did not

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pay, and once committed without the choice of paying. After this exhaustive experimentation with the money penalty, he was sentenced to 12 months' imprisonment (1890), which, together with the succeeding 9 sentences (1891–97), compelled him to remain at Deer Island for five years and eleven months. But in April of 1897 he was once more fined $5, and again twice in 1898 and twice in 1900. During January of the present year he has been committed twice for the non-payment of $5 fines.

In contrast, some, though very few, have not escaped with a fine penalty even once during the last decade. Others, again the exception, were not given the privilege of paying fines at the earliest stage. Thus No. 112 was committed the first 5 times on term sentences, but subsequently has been fined 13 times. The multiplication of sentences to pay fines is not wholly a thing of the past. No. 78, for instance, was committed seven times in 1900, and five out of these for non-payment of amounts not exceeding $5.

Two cases, Nos. 16 and 54, form singular exceptions — neither has been committed a single time for non-payment. As regards the latter, an explanation lies in the fact that 16 out of 20 commitments were for vagrancy, and vagrants are not supposed to possess as much money as the confirmed inebriate. The record of the former case, however, presents nothing unusual, for 14 of his 17 commitments were for drunkenness. Why this one man should have been singled out for severer punishment than the remaining 138 cannot be told. In general, we know that the seemingly contradictory treatment accorded misdemeanants of the same class, which is just as apparent from the individual record as by a comparison of records, is attributable (to what extent we cannot tell) to the fact that these offenders from time to time turn up in different courts. They are not always recognized, neither is there a record of previous arrests and commitments at hand. Or, if recognized, it is not ascertained

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whether they have been sentenced by any other court since their last appearance.

Thus it happens that an inveterate rounder, with a record of 101 commitments to Deer Island, is committed the one hundred and second time by a court which is ignorant of his past, and, in consequence, he escapes with lightest penalty permitted under the law.

Numerous offenders — it appears to be a piece of premeditated cunning — are known to be in the habit of avoiding arrest within the boundaries of the court district in which they were last apprehended. By going the rounds of the different municipal courts in Suffolk County, there is less likelihood of receiving heavy sentences, as is apparent from the subjoined parts of two records, which also illustrate the variety of penalties that may be imposed upon the same person by the same court and for the same offence. With one exception each commitment was for drunkenness.

CASE A.

No. of Commitment.	Date.	Court.	Penalty.
93	January 3, 1898 . .	South Boston..	$5.00.
94	March 23, " . .	Central	3 months.
95	June 25, " . .	Dorchester . .	$5.00.
96	January 11, 1899 . .	Central	2 months.
97	March 11, " . .	"	5 "
98	August 14, " . .	"	*1 "
99	September 25, " . .	"	3 "
100	January 25, 1900. .	Dorchester . .	$5.00.
101	April 23, " . .	Central	6 months.
102	October 24, " . .	Roxbury	$5.00.
103	January 3, 1901. .	East Boston . .	"
104	" 21, " . .	South Boston..	"

*Larceny.

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CASE B.

No. of Commitment.	Date.	Court.	Penalty.
37	April 22, 1898..	East Boston . .	$5 00.
38	August 8, " . .	South Boston..	"
39	September 8, " . .	Charlestown . .	"
40	November 17, " . .	Central	6 months.
41	June 19, 1899..	"	$10.00.
42	August 28, " . .	"	3 months.
43	March 23, 1900.	South Boston..	$5.00.
44	May 19, " . .	"	"
45	October 6, " . .	Dorchester . . .	3 months.
46	January 8, 1901..	Chelsea	$5.00.

Without a single exception the 140 persons have at some time been sentenced to imprisonment for three or more months on account of public intoxication. No less than 118, or 84.28 per cent, have been given a maximum sentence of six or more months, in nearly all cases for drunkenness; while 51, or 36.42 per cent, have served sentences of 12 months, several more than once. In the light of these facts, it becomes doubly significant that 46, or 32.85 per cent, of the whole number were fined $5 or more at the time of their last appearance in court in 1900, and because they did not pay were committed for eight days, which under our law is the measure of time equivalent to the above amount of money or any fraction of it.

In 125 cases, or 89.28 per cent, the last sentence imposed was not nearly so severe, usually not by one-half, as the maximum sentence imposed upon the same person and generally for the same offence. That is to say, when the maximum sentence for drunkenness is found to be 12 months in any case the last sentence imposed upon the same person will be found to be imprisonment from 1 to 6 months, or perhaps a small fine. In 47 of the 51 cases with maximum

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sentences of 12 months in each instance, the last sentences were much lighter, and in 8 of them the last commitment was for non-payment of fines.

As a matter of fact, then, so far as can be gleaned from the records, little or no attention is paid to the time of sentence to previous sentences for the same offence with respect to their number and degree of severity.

Fines.

Two of our cases are distinguished by reason of never having been committed for non-payment of fines. The remaining 138 have been sent to Deer Island in expiation of fines amounting to a total of $17,589.26. The next summary indicates the extent to which the unpaid fines have accumulated in individual cases.

AMOUNT OF FINES.

	$50 or less.	$50–$100.	$100–$200.	$200–$300.	$300–$400.	$400–$500.	$600–$700.	Not Fined.
Number of Persons ..	18	42	57	14	5	1	1	2
Per cent	12.86	30.00	40.71	10.00	3.58	0.71	0.71	1.43

More than one-half (74) never paid a cent of the fines imposed. Of the remaining 64, not one has in all paid a greater sum than $24, and the total amount turned into the county treasury by them (or, probably more correctly, by their families and friends) foots up, as nearly as can be ascertained, to $433.43, or considerably less than the sum of the fines imposed upon one person among our 140, as shown above. Commitments have, of course, in each instance, preceded payment where such has been tendered, usually by several days.

Duration of Imprisonment.

A comparison of the number of commitments in different cases for the same offence with the duration of imprisonment

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seems to indicate that there is no equable relation between offence and penalty, and that it is a matter of accident, not of degree of guilt, whether a person be kept in jail for two or eight years. The following tabular statement of a few illustrative cases necessarily leads to this conclusion:—

CASES IN WHICH ALL COMMITMENTS WERE FOR DRUNKENNESS.

Number of Case.	Number of Commitments.	Duration of Imprisonment.
45	20	2 years – months 21 days
60	21	7 " 10 " 8 "
78	24	3 " – " 1 "
83	25	8 " 11 " 23 "
100	33	8 " 3 " 28 "
102	33	5 " – " 11 "
132	58	8 " 10 " 10 "

Precisely the same peculiarity may be noted in cases of persons committed for a variety of misdemeanors, as may be seen from the following examples:—

Number of Case.	Number of Commitments.	Number and kind of Offences.	Duration of Imprisonment.
9	16	Drunkenness . . . .15 Larceny 1	2 years 10 months 8 days
12	17	Drunkenness . . . .16 Larceny 1	6 " 9 " 13 "
16	17	Drunkenness . . . .14 Larceny . . . . . .1 Assault and Battery . .1 Vagrancy 1	6 " . " 26 "
20	17	Drunkenness . . . . .8 Assault and Battery . .3 Larceny . . . . . .4 Vagrancy . . . . . .1 Disorderly Conduct . .1	2 " 6 " 3 "

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It is perfectly understood that the discrepancies in penalties noted above have to a limited extent been caused by changes in the law. Thus, if many commitments took place between July, 1891 and 1893, they would all be on term sentences, for the fine was then abolished. Moreover, the usual fine stood for a month in prison until 1881, when its equivalent in time was reduced to 10 days, only to be restored as before in 1885. In 1899, however, the sliding scale was altered once more, and since then a fine of $5 has been "worked out" by 8 days in jail. Notwithstanding these considerations, it remains true of the cases cited as well as of many others, that the penalties inflicted apparently bear little relation to the number and kind of offences.

In reckoning the time served on term sentences, deductions have been made for pardons when such have been granted, but the full time of the last sentence has been included; in some instances this may not have been completed at the time of investigation. Allowances have also been made for each fine paid after commitment.

Each one of the 140 persons has spent not less than a year of his life in the Deer Island prison. One, a woman, has been confined there for 22 years, 6 months, and 15 days, and nearly the whole time for drunkenness. During the 29 years covered by her record, she has been out of prison but 7 years, 6 months, and 15 days. No less than 63, or 45 per cent of the whole number have been kept at Deer Island for more than 5 years. A summary showing by groups the total time of imprisonment follows. Attention is called to the large number who have been confined between 7 and 8 years: —

TOTAL TIME IMPRISONED.

	YEARS.													
	1-2.	2-3.	3-4.	4-5.	5-6.	6-7.	7-8.	8-9.	9-10.	10-11.	11-12.	12-13.	14-15.	Over 15.
Number of Persons....	7	28	23	19	10	10	15	11	5	2	5	2	2	1
Per cent.....	5.00	20.00	16.43	13.57	7.15	7.15	10.71	7.85	3.57	1.43	3.57	1.43	1.43	0.71

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The duration of imprisonment for non-payment of fines has been determined by several factors, the least important of which is part-payment after commitment since it is seldom made, and the total amount in individual cases is so small. The magnitude of the fine supposedly corresponds to the gravity and nature of the offence. Usually it costs more to commit assault and battery than to steal or get drunk. The largest single fine in our records is one of $50; in numerous instances, however, the maximum money penalty has exceeded $20. Some courts are seemingly in the habit of administering much heavier fines than others. This probably explains why each one of the 96 fines imposed on one person for drunkenness amounted to less than $10, while another, with less than half as many commitments for the same offence has frequently been asked to contribute $15. On the whole, it must be said that, no matter what the offence, a uniform relation between the total amount of fines imposed upon a person and the number of fine sentences is not to be looked for even when the same offence has been committed. For this reason it seemed simpler when the fines were imposed on two counts for the same or different misdemeanors to regard them as one in our tables.

The changes in the law fixing the money penalty in drunk cases, to which allusion has already been made, must be taken into consideration. In addition to the variability of the maximum money penalty, the equivalent of the same in days and weeks of confinement has been changed by legislative enactment three times during the years covered by our records, both of which circumstances have in many cases materially affected the duration of imprisonment for unpaid fines and costs. Several of the 140 men and women have had the unique experience of being detained in jail 10, 30 and 8 days for non-payment of fines of exactly the same amount in each instance. The shortest term of imprisonment in our records for failure to pay fines is 16 days and

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the longest 6 years, 10 months and 15 days. A summary follows.

DURATION OF IMPRISONMENT FOR NON-PAYMENT.

	Years.					
	Less than one.	1-2.	2-3.	3-4.	4-5.	6-7.
Number of Persons....	60	53	15	6	3	1
Per cent.....	43.48	38.38	10.88	4.35	2.18	0.73

Two per sons have never been fined.

Eight cases afford remarkable illustrations of the extent to which the fine penalty may be used: All of them have spent a longer time at Deer Island for non-payment of fines than on term sentences; that is to say, they have averaged less than 30 days in jail on nearly all commitments, and in 5 of these 6 cases the last commitment in 1900 was for unpaid fines. The details will be found in the appended tables. (*See* Nos. 10, 28, 29, 55, 74, 91, 105, 118.)

Records in other Institutions.

A total of 62, or 44.28 per cent, are known to have been for longer or shorter terms in other public institutions than the House of Correction at Deer Island. A more searching inquiry than circumstances permitted would doubtless have yielded a much heavier percentage as well as revealed a more varied institutional record in several instances. Even as regards pauper histories, the information is not complete, since little is known in this respect about cases having residences outside Boston. It is found, however, that 35, or 25.00 per cent, have at some time been committed to the City almshouses, from 1 to 37 times each. Of these again some, prior to obtaining a settlement in Boston, had been State paupers, others also have records at Foxboro', the State Reformatories, the House of Correction at South Boston, etc.

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What is known about records in other penal establishments is derived in the first instance from statements made by the persons concerned. In the absence of adequate means of identification, it would have been useless to pursue further inquiries in this direction, had other circumstances been propitious. The details given in the appended tables regarding institution records outside Deer Island are, therefore, more suggestive than complete, yet give some additional hints of the moral degradation and physical and mental deterioration of these unfortunates.

Family Relations.

How far hereditary causes have contributed to shape the downward career of the persons in question can only be surmised. The fragmentary bits of family history that have leaked out indicate that not a few have sprung from stock tainted with insanity and other maladies, or having members noted for various forms of anti-social conduct. Some are *analphabets*, and few appear to have risen above the lowliest occupations. But allowing that not even a majority were handicapped by birth and environment, can this be said of their children?

Anything like a complete census of their descendants is not available. From personal statements made by them, it is known that 65, or 46.42 per cent, have been fathers or mothers of children. But the aversion of the average prisoner to any inquiry into his conjugal relations is well known. Men who have deserted their wives prefer to pose as single; the marital relations may not have been of the strictly legal order; and there may be other reasons for prevarication.

Those who admit marriage have in all had 207 children, an average of about 3 to the family. Only 15 cases are noted for a large number of children, from 5 to 9 each. Of the subsequent history of these children very little is known. Some of them are said to have died, probably in infancy.

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The sad lives others have led may be imagined from a single illustration. E., an illegitimate child of an inebriate mother, placed in the Marcella-street Home at a tender age, later admitted to the House of the Good Shepherd, thence sent to the Almshouse at Long Isiand, thence to the Worcester Insane Hospital, and, lastly, to the Medfield Insane Asylum, where she died in 1899. There is the greater reason for picturing darkly the fate of these children, of whom some must now have reached maturity, because many of them were brought into the world after their parents had become confirmed in inebriate or criminal habits. This is a necessary inference from the fact that the parents were committed to Deer Island while still very young, in some instances under 21 years of age. The records tell, furthermore, of mothers bringing their infants with them to the House of Correction. For aught that is known to the contrary, some of these children may have seen daylight for the first time within prison walls.

Cost of Maintenance.

The total amount of money expended by Suffolk County as well as by the Commonwealth for the maintenance of the 140 persons in public institutions during the time covered by the records cannot be stated with exactness. Indeed, owing to the imperfect knowledge of their relations to State establishments, the expense incurred by the State on their account has not even been inquired into. It is known, however, that on the basis of averages for a period of years, the County has spent in cash outlay for the maintenance of these same persons at Deer Island $66,991.52, and at the almhouses and the South Boston House of Correction $10,525.93, a total of $77,517.45.

In contrast, let it be repeated, the whole amount paid in fines by these same persons subsequent to commitment was $433.43, which, needless to say, has been deducted from the sum showing cost.

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Yet, after all, the bare cost of maintenance represents but a part of the expense the community has been put to on account of these misdemeanants. The cost of making arrests is reckoned by the Department of Police to be $8.04 for each. Counting only the arrests followed by commitments in the present cases, the additional sum of nearly $34,000 is reached. Further, the cost of commitments, the transportation from the courts, form a very large item which at present cannot be estimated. To this should be added part of the expense of the courts and of the public relief of the families of the misdemeanants or of themselves while they are at liberty, etc.

Any attempt, therefore, to express in figures the total drain upon the tax payers from this source is almost futile, at least in the light of our present knowledge. But enough has been said to indicate the magnitude of the problem involved even from the point of view of public expense.

The general conclusions to be drawn from the facts laid bare by this investigation are perhaps too obvious to require specification. With suggestions of more adequate methods for the treatment of recidivists among misdemeanants it has no concern; that is a matter demanding separate consideration and study. First the present conditions of the problem need to be throughly understood. The support of an enlightened public opinion must be had before a radical departure from prevailing methods and habits is undertaken.

The minor courts of Massachusetts possess unusual facilities for a thorough investigation and disposition of criminal cases through the medium of the probation service, which, during a period of more than twenty years, has grown from a tentative private enterprise into a firmly established and indispensable part of the judicial machinery. Under the present law, dating from 1891, a probation officer must be appointed by each municipal, police, and district court, and under a later act such appointments by the superior court are permissive.

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Since its inception, the probation system has had these three general objects: (1) To secure a thorough investigation of the cases of all persons arrested, so that they may be dealt with not on the basis of the offence merely, but on the basis of the character of the offender. (2) To stay the hand of the law whenever there is well-founded reason to believe that the offender will reform if given another chance, and thus to save him at the beginning of the downward career, instead of attempting his salvation amid the baneful influences of prison life or even later. (3) To give the released offender a friendly monitor and advisor in the person of a representative of the law who shall supervise his conduct during the period of probation.

The specific duties of probation officers are thus to inquire into the nature of all criminal cases brought before the court under whose jurisdiction they act, to report their findings to the court together with records of previous arrests and convictions, to exercise custodial supervision over persons placed on probation, and in other ways to assist the court in the disposition of cases as well as the persons brought to trial.

The probation system is nothing less than the discovery of a method of dealing with wrongdoers which is far more effective, economical and humane than imprisonment. Yet probation does not mean escape from punishment, for that reaches the offender through the public conviction of his guilt, and the probationer is, moreover, under restraint for a definite period. It does mean a chance to redeem one's self outside prison walls, under the eyes of the court, and with the certainty that a relapse will have its just retribution. It is, in other words, a method combining the most effective deterrent punishment with every incentive to good behavior in the future.

The most important functions of the probation service relate to the treatment of first and occasional offenders, and its value is to be measured, in the first instance, by its salvage

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from this class. All that is accomplished year by year cannot easily be expressed in figures, but it is an impressive fact that during the last decade about 50,000 men and women have been taken on probation whose combined sentences, if carried out, would at a low estimate have been equivalent to about 11,500 years in prison at a public cost of more than half a million dollars. To be sure, not all who have been given a new opportunity to begin an upright life have made the most of it. But if only one-half were reclaimed the gain is inestimable, and it is a gain not to be reckoned in dollars and cents but in the manhood and womanhood of the State.

Of special interest in the present connection is the usefulness of the probation service in securing a proper disposition of the cases of habitual misdemeanants. The facts laid bare by the investigation do not indicate that such offenders are invariably dealt with according to their merits, or that trials are preceded by a wholly adequate inquiry into the nature of each case. Even its most ardent advocates do not claim that the probation service accomplishes all that is desirable in this respect, far from it. The trouble lies not with the system itself but with its present unsystematized condition. There is a manifest lack of co-ordination of the work, of co-operation and organization under some form of central supervision. Within the municipality of Boston there are eight minor courts all having probation officers. But the latter work independently of each other without means for rapid intercommunication. There is no common repository for assembling the results of investigations in criminal cases, and from which an officer may draw information with regard to offenders who are new to his court, but may have records in several other courts. Thus, however invaluable the services of a probation officer may be in dealing with offenders residing within his own court district, he is frequently handicapped in the investigation of cases of non-residents, espec-

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ially if they are habitual misdemeanants, because he lacks ready access to their records in other courts. It will be seen that the difficulty is largely a mechanical one which systematic effort can easily adjust. Yet there will remain the problem of inducing the courts always to give consideration to previous arrests and convictions before pronouncing sentence. The divergent and often contradictory methods exhibited by different courts in their treatment of habitual misdemeanants, of which many examples have been given, cannot be harmonized simply by an improvement of the probation service. Nevertheless, in the treatment of this class of offenders there has been some progress in Boston of late years, thanks to the extension and better appreciation of the probation system.

NOTE.--The cases in the appended tables have been grouped according to the number of offences and with a view to making comparisons easy. This seemed the best arrangement possible.

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TABLES.

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TABLES SHOWING RESULTS OF THE INVESTIGATION FOR THE INDIVIDUAL CASES.

[Abbreviations: Dk., drunkenness; L., larceny; A. & B., assault and battery; V., vagrancy; I. & D., idle and disorderly; N. W., night-walking; Tresp., Trespassing.]

Number.	Present Age.	Sex.	Times Committed.	Offences.					Age at First Commitment.	First Sentence.		Maximum Sentence.		Last Sentence.		Times Fined.	Total Amount of Fines.	Times Paid.
				Dk.	L.	A. & B.	V.	Other.		Offence.	Penalty.	Offence.	Penalty.	Offence.	Penalty.			
1	47	M.	15	15	.	..	..	..	33	Dk.	$5.00	Dk.	12 m.	Dk.	$5.00	11	$61.10	-
2	56	F.	15	15	..	..	..	..	38	Dk.	5.95	Dk.	6 m.	Dk.	5.00	11	60.95	-
3	39	F.	15	9	1	1	..	4	25	Dk.	5.95	Dk.	9 m.	I & D.	20.00	10	72.50	1
4	47	M.	15	11	..	2	..	2	37	Dk.	9.45	Dk.	3 m.	Tresp.	20.00	8	75.20	-
5	42	F	15	13	1	..	..	1	19	Dk.	7.95	Dk.	6 m.	Dk.	10 dys.	11	64.65	1
6	27	M.	16	9	6	..	..	1	18	Dk.	5.00	Dk.	10 m.	L.	$25 00	3	32.00	-
7	50	M.	16	9	..	5	1	1	24	Dk.	7.95	Dk.	9 m.	Dk.	5.00	10	129.46	-
8	35	M.	16	13	1	..	1	1	16	L.	11.97	V.	4 m.	Dk.	3 m.	12	102.22	1
9	30	M.	16	15	1	..	..	.	23	Dk.	2 m.	Dk.	6 m.	Dk.	$5.00	5	35.00	-
10	43	M.	16	16	..	..	..	..	29	Dk.	$5.00	Dk.	4 m.	Dk.	5.00	13	100.24	2
11	57	M.	16	16	..	..	..	..	47	Dk.	5.00	Dk.	6 m.	Dk.	5.00	8	40.00	-
12	25	M.	17	16	1	..	..	..	18	Dk.	3 m.	Dk.	6 m.	Dk.	6 m.	1	5.00	-
13	50	M.	17	17	..	..	..	..	40	Dk.	$5.00	Dk.	12 m.	Dk.	3 m.	3	20 63	-
14	50	M.	17	17	..	..	..	..	38	Dk.	5.00	Dk.	6 m.	Dk.	6 m.	8	45.00	2
15	40	F.	17	17	..	..	..	..	26	Dk.	5.00	Dk.	9 m.	Dk.	2 m.	11	55.90	-
16	41	M.	17	14	1	1	1	..	25	A. & B.	6 m.	Dk.	12 m.	V.	3 m.	..	....	-
17	33	M.	17	14	2	1	..	..	20	Dk.	$5.00	Dk.	12 m.	Dk.	3 m.	9	55.00	1
18	30	M.	17	9	4	2	..	2	15	L.	4 m.	Dk.	10 m.	Dk.	$5.00	7	89.10	-
19	40	M.	17	6	6	1	3	1	24	Breaking glass.	$12 35	V.	6 m.	L.	2 m.	10	116.06	-
20	47	M.	17	8	4	3	1	1	26	A. & B.	10.55	Dk.	4 m.	L.	$15 00	7	78.75	1

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Number.	Time Imprisoned at Deer Island House of Correction.									Commitments to Other County Institutions.								Actual Cost of Maintenance.			Number Times Committed to State Institutions.
	On term sentence.			For non-payment of fines.			Total time.			House of Correction, South Boston.				Almshouses.				At House of Cor., Deer Isl.	At Other County Instit.	Total.	
	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.				
1.....	2	1	..	..	9	9	2	10	9	..	..	..	..	..	..	..	..	$251.05	*$5.00	$256.05	1 (State Hosp.)
2.....	1	8	..	..	7	26	2	3	26	..	..	..	..	..	..	..	..	186.57	....	186.57	-
3.....	2	3	..	..	9	10	3	..	10	..	..	..	..	..	..	..	..	265.94	....	265.94	-
4.....	1	7	..	..	7	28	2	2	28	..	..	..	..	..	..	..	..	197.02	....	197.02	2 (State Hosp.)
5.....	1	1	10	..	7	12	1	8	22	..	..	..	..	..	..	..	..	146.54	....	146.54	-
6.....	5	1	..	..	2	20	5	3	20	..	..	..	..	..	..	..	..	464.09	....	464.09	(Concord Ref.)
7.....	2	6	..	1	2	8	3	8	8	..	..	..	..	21	4	3	7	318.90	537.53	856.43	-
8.....	..	9	..	..	8	13	1	5	13	..	..	..	..	30	4	6	10	124.36	570.06	694.42	-
9.....	2	6	..	..	4	8	2	10	8	..	..	..	..	..	..	..	..	250.81	....	250.81	-
10.....	..	8	..	1	..	5	1	8	5	..	..	..	..	..	..	..	..	137.61	....	137.61	1 (State Hosp.)
11.....	2	6	..	..	5	6	2	11	6	..	..	..	..	2	..	4	..	257.66	41.96	299.62	-
12.....	6	8	27	..	..	16	6	9	13	..	..	..	..	..	..	..	..	383.88	....	383.88	-
13.....	4	3	4	..	2	18	4	5	22	..	..	..	..	13	2	5	22	359.29	333.91	693.20	-
14.....	2	11	..	..	3	22	3	2	22	..	..	..	..	..	..	..	..	192.25	....	192.25	-
15.....	2	4	..	..	11	..	3	3	..	..	..	..	..	..	..	..	..	285.51	....	285.51	1 (Sherborn.)
16.....	6	..	26	..	..	..	6	..	26	..	..	..	..	..	..	..	..	533.31	....	533.31	1 (Concord Ref.)
17.....	2	2	..	..	8	8	2	10	8	..	..	..	..	..	..	..	..	250.81	....	250.81	-
18.....	3	5	2	..	8	8	4	1	10	..	..	..	..	..	..	..	..	360.96	....	360.96	-
19.....	2	..	5	1	..	10	3	..	15	..	..	..	..	11	1	10	17	267.15	236.70	503.85	-
20.....	2	2	..	..	4	3	2	6	3	..	..	..	..	3	..	6	..	216.50	62.94	279.44	1 (Foxboro'.)

* Observation Hospital at Deer Island, 1 time.

Digitized by Google

Number.	Present Age.	Sex.	Times Committed.	Offences.					Age at First Commitment.	First Sentence.		Maximum Sentence.		Last Sentence.		Times Fined.	Total Amount of Fines.	Times Paid.
				Dk.	L.	A. & B.	V.	Other.		Offence.	Penalty.	Offence.	Penalty.	Offence.	Penalty.			
21.....	48	M.	17	14	..	2	..	1	23	A. & B.	$18.85	Dk.	9 m.	Dk.	2 m.	9	$86.85	1
22.....	48	M.	17	16	..	..	1	..	22	V.	3 m.	Dk.	5 m.	Dk.	$5.00	12	65.00	–
23.....	42	M.	17	16	..	1	..	..	20	Dk.	$7.95	Dk.	4 m.	Dk.	4 m.	12	79.80	1
24.....	35	M.	17	17	..	..	..	..	19	Dk.	5.95	Dk.	6 m.	Dk.	3 m.	8	49.62	1
25.....	32	M.	18	16	1	1	..	..	16	Dk.	7.00	Dk.	10 m.	Dk.	$10.00	14	101.47	1
26.....	49	M.	18	17	1	..	..	..	31	Dk.	5.95	Dk.	4 m.	Dk.	5.00	12	78.60	1
27.....	40	F.	18	16	..	2	..	..	26	A. & B.	11 83	Dk.	5 m.	Dk.	5.00	11	77.86	–
28.....	45	M.	18	16	..	..	1	1	30	Dk.	5.95	V.	3 m.	Dk.	5.00	16	79.80	–
29.....	..	F.	18	15	..	..	..	3	..	Dk.	5.95	N. W.	6 m.	Dk.	2 m.	13	101.53	–
30.....	41	M.	18	15	1	1	1	..	34	A. & B.	25.00	Dk.	12 m.	Dk.	8 m.	7	70.00	–
31.....	46	M.	18	18	..	..	..	..	29	Dk.	5.95	Dk.	6 m.	Dk.	4 m.	16	87.80	–
32.....	34	F.	18	18	..	..	..	..	18	Dk.	5.95	Dk.	5 m.	Dk.	$10.00	12	108.73	1
33.....	40	M.	18	17	..	1	..	..	29	Dk.	5.00	Dk.	6 m.	A. & B.	3 m.	11	65.00	–
34.....	69	M.	18	17	..	..	1	..	53	Dk.	5.95	Dk.	9 m.	V.	6 m.	8	41.90	–
35.....	37	M.	18	12	..	5	..	1	21	A. & B.	7.36	Dk.	7 m.	Dk.	$5.00	13	142.81	2
36.....	65	M.	18	17	..	1	..	..	51	Dk.	5.00	Dk.	4 m.	Dk.	2 m.	10	72.05	–
37.....	39	F.	19	15	..	1	..	3	22	Destroy Property.	15.15	Dk.	9 m.	Dk.	3 m.	10	71.92	2
38.....	30	M.	19	17	..	1	..	1	18	Dk.	5.00	Dk.	6 m.	Dk.	$5.00	11	75.00	–
39.....	66	M.	19	19	..	..	..	..	58	Dk.	5.00	Dk.	9 m.	Dk.	5 m.	8	40.00	–
40.....	55	M.	19	18	1	..	..	..	42	Dk.	5.00	Dk.	6 m.	Dk.	3 m.	12	60.00	–
41.....	34	M.	19	13	..	2	..	4	18	I. & D.	11.35	Dk.	6 m.	Dk.	1 m.	4	49.23	1
42.....	42	F.	19	14	1	3	..	1	18	Dk.	7.95	Dk.	6 m.	Dk.	2 m.	11	61.38	1
43.....	32	M.	19	14	3	1	..	1	18	Dk.	6 m.	Dk.	9 m.	Dk.	9 m.	12	111.44	2
44.....	38	F.	20	20	..	..	..	..	20	Dk.	$5.95	Dk.	9 m.	Dk.	9 m.	14	79.50	1
45.....	38	M.	20	20	..	..	..	..	23	Dk.	5 95	Dk.	8 m.	Dk.	1 m.	16	101.85	6

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Number.	Time Imprisoned at Deer Island House of Correction.									Commitments to Other County Institutions.								Actual Cost of Maintenance.			Number Times Committed to State Institutions.
	On term sentence.			For non-payment of fines.			Total time.			House of correction, South Boston.				Almshouses.				At House of Cor., Deer Isl.	At Other County Institt.	Total.	
	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.				
21	2	10	..	..	8	10	3	6	10	..	..	..	..	2	..	8	..	$309.86	$83.92	$393.78	1 (State Hosp.)
22	1	5	..	..	5	18	1	10	18	..	..	..	..	..	..	..	..	158.96	....	158.96	-
23	1	2	..	1	..	8	2	2	8	..	..	..	..	..	..	..	..	192.25	....	192.25	-
24	2	11	..	..	6	20	3	5	20	..	..	..	..	..	..	..	..	304.93	....	304.93	1 (Concord Ref.)
25	1	7	..	..	10	8	2	5	8	..	..	..	..	..	..	..	..	211.01	...	211.01	-
26	1	11	..	..	8	8	2	7	8	..	..	..	..	4	1	..	4	224.38	127.31	351.69	-
27	2	6	..	..	8	4	3	2	4	..	..	..	..	..	..	..	..	277.87	....	277.87	-
28	..	4	..	1	.	7	1	4	7	..	..	..	..	..	..	..	..	118.80	....	118.80	-
29	1	1	9	1	2	6	2	3	15	..	..	..	..	..	..	..	..	201.24	...	201.24	-
30	4	6	..	..	7	24	5	1	24	..	..	..	..	..	..	..	..	452.30	....	452.30	1 (State Hosp.)
31	1	8	..	1	1	10	2	9	10	..	..	..	..	..	..	..	..	238.21	....	238.21	1 (State Hosp.)
32	2	4	..	1	1	20	3	5	20	..	..	..	..	..	..	..	..	273.88	....	273.88	-
33	1	10	..	..	8	9	2	6	9	..	..	..	..	..	..	..	..	217.93	....	217.93	-
34	3	3	..	..	5	28	3	8	28	..	..	..	..	..	..	..	..	328.79	....	328.79	-
35	2	6	..	1	..	7	3	6	7	..	..	..	..	..	..	..	..	309.14	....	309.14	-
36	1	10	19	..	7	18	2	6	7	..	..	..	..	..	..	..	..	221.29	....	221.29	-
37	3	9	..	..	10	22	4	7	22	1	..	5	24	..	..	..	..	407.89	....	...	-
38	2	3	..	..	10	8	3	1	8	..	..	..	..	..	..	..	..	272.14	....	272.14	1 (Concord Ref.)
39	4	11	..	..	8	..	5	7	..	..	..	..	..	..	..	..	..	490.39	....	490.39	-
40	1	7	..	1	..	3	2	7	3	..	..	..	..	..	..	..	..	227.66	....	227.66	-
41	4	7	..	..	4	..	4	11	..	..	..	..	..	..	..	..	..	424.88	....	424.88	-
42	3	5	..	..	9	20	4	2	20	..	..	..	..	..	..	..	..	370.42	....	370.42	-
43	2	4	..	..	10	16	3	2	16	..	..	..	..	..	..	..	..	270.73	....	270.73	-
44	2	5	..	1	..	9	3	5	9	..	..	..	..	7	..	7	13	302.30	77.75	380.05	-
45	1	3	..	..	9	21	2	..	21	..	..	..	..	5	1	10	3	180.70	231.86	412.56	1 (Foxboro'.)

Number.	Present Age.	Sex.	Times Committed.	Offences.					Age at First Commitment.	First Sentence.		Maximum Sentence.		Last Sentence.		Times Fined.	Total Amount of Fines.	Times Paid.
				Dk.	L.	A. & B.	V.	Other.		Offence.	Penalty.	Offence.	Penalty.	Offence.	Penalty.			
46.....	31	M.	20	20	..	..	..	..	19	Dk.	$5.00	Dk.	6 m.	Dk.	3 m.	11	$60.00	-
47.....	34	M.	20	12	4	..	..	4	17	Dk.	8.65	Dk.	10 m.	Dk.	3 m.	11	133.03	-
48.....	66	M.	20	12	2	1	..	5	39	Tresp.	28.10	Dk.	4 m.	I. & D.	3 m.	14	133.83	1
49.....	30	M.	20	14	..	.	3	3	18	Dk.	6.10	Dk.	12 m.	V.	3 m.	4	31.80	-
50.....	37	M.	20	11	6	1	1	1	16	I. & D.	3 m.	Dk.	3 m.	Dk.	$10.00	12	97.15	-
51.....	56	M.	20	18	..	..	..	2	33	Dk.	$10.63	Dk.	6 m.	Dk.	5 m.	16	110.23	-
52.....	42	M.	20	18	1	1	..	..	22	Dk.	1.85	Dk.	5 m.	Dk. & L.	$35.00	14	102.80	-
53.....	45	M.	20	16	1	2	..	1	23	A. & B.	10.08	Dk.	6 m.	Dk.	1 m.	14	102.05	2
54.....	57	M.	20	3	1	..	16	..	32	V.	4 m.	Dk.	12 m.	Dk.	12 m.	..	....	-
55.....	30	M.	21	18	1	2	.	..	16	Dk.	$5 00	Dk.	5 m.	Dk.	$5.00	19	139.03	3
56.....	31	M.	21	13	4	1	..	3	20	Dk.	5.00	L.	6 m.	Dk.	5.00	13	105.00	2
57.....	45	F.	21	20	..	..	1	..	35	V.	4 m.	Dk.	9 m.	Dk.	3 m.	6	35.00	-
58.....	45	M.	21	16	..	5	..	..	30	A. & B.	$17.35	Dk.	12 m.	Dk.	3 m.	9	118.55	1
59.....	38	F.	21	17	..	..	..	4	22	I. & D.	3 m.	Dk.	12 m.	N. & W.	6 m.	10	50.95	-
60.....	41	F.	21	21	..	..	..	..	27	Dk.	$5.00	Dk.	12 m.	Dk.	$3.00	13	63.00	-
61.....	72	F.	21	20	..	..	..	1	60	Dk.	5.00	Dk.	12 m.	Dk.	1 m.	7	46.75	-
62.....	60	M.	21	20	1	..	..	..	50	Dk.	5.00	Dk.	12 m.	Dk.	1 m.	8	50 00	1
63.....	39	M.	21	20	..	..	1	..	29	Dk.	5.00	Dk.	12 m.	Dk.	4 m.	6	40.00	-
64.....	40	M.	21	19	..	1	..	1	18	A. & B.	9.70	Dk.	5 m.	Dk.	5 m.	11	90.93	3
65.....	34	M.	21	18	2	1	..	..	20	L.	2 m.	Dk.	6 m.	Dk.	1 m.	14	121.45	2
66.....	39	F.	21	19	1	..	1	..	20	Dk.	$1.85	Dk.	12 m.	Dk.	3 m.	14	89.75	-
67.....	36	M.	22	22	..	..	..	..	17	Dk.	6 m.	Dk.	10 m.	Dk.	$15.00	16	215.00	-
68.....	45	M.	22	21	..	..	..	1	34	Dk.	$5.00	Dk.	8 m.	Dk.	5.00	16	100.00	7
69.....	33	F.	22	19	1	2	..	..	18	Dk.	7.75	Dk.	12 m.	Dk.	3 m.	12	127.87	-
70.....	48	M.	22	15	..	6	..	1	35	Dk.	5.00	Dk.	5 m.	Dk.	$2.00	15	163.00	-

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	On term sentence.			For non-payment of fines.			Total time.			House of correction, South Boston.				Almshouses.				At House of Cor., Deer Isl.	At Other County Instit.	Total.	
	Yrs.	Mos.	Dys.	Yrs	Mos.	Dys.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.				
46	2	4	..	..	11	5	3	3	5	..	..	..	..	7	2	6	3	$286.71	$315.82	$602.53	–
47	4	..	..	1	1	14	5	1	14	..	..	..	..	..	..	..	..	449.91	....	449.91	–
48	1	7	..	1	3	2	2	10	2	..	..	..	..	..	..	..	..	227.60	....	227.60	–
49	6	9	..	..	4	8	7	1	8	..	..	..	..	..	..	..	..	623.54	....	623.54	–
50	1	7	..	..	10	2	2	5	2	..	..	..	..	..	..	..	..	209.58	....	209.58	–
51	2	8	..	..	11	6	3	7	6	..	..	..	..	..	..	..	..	316.23	....	316.23	–
52	2	1	..	1	5	18	3	6	18	..	..	..	..	..	..	..	..	311.72	....	311.72	2 (State Hosp.)
53	1	4	..	1	.	20	2	4	20	..	..	..	..	..	..	..	..	209.28	....	209.28	–
54	8	7	..	..	..	..	8	7	..	..	..	..	..	..	..	..	..	749.56	...	749.56	1 (State Farm.)
55	..	4	10	1	3	11	1	7	21	..	..	..	..	..	..	..	..	139.62	....	139.62	–
56	2	2	..	..	9	8	2	11	8	..	..	..	..	..	..	..	..	258.13	....	258.13	–
57	4	3	15	..	5	26	4	9	11	..	..	..	..	..	..	..	..	415.77	....	415.77	4 (State Hosp.)
58	6	4	..	1	1	6	7	5	6	..	..	..	..	..	..	..	..	649.79	....	649.79	–
59	6	11	..	..	9	10	7	8	10	6	3	5	..	..	..	..	..	670.78	515.25	1,186.03	–
60	6	10	..	1	..	8	7	10	8	..	..	..	..	..	..	..	..	683.66	....	683.66	–
61	9	2	..	..	6	20	9	8	20	..	..	..	..	..	..	..	..	853.99	....	853.99	–
62	4	1	..	..	6	29	4	7	29	..	..	..	..	..	..	..	..	309.56	....	309.56	–
63	6	7	..	..	4	28	6	11	28	..	..	..	..	..	..	..	..	614.30	....	614.30	1 (Concord Ref.)
64	3	11	..	..	8	15	4	7	15	..	..	..	..	..	..	..	..	370.98	....	370.98	1 (Concord Ref.)
65	1	8	..	..	11	5	2	7	5	..	..	..	..	..	..	..	..	228.14	• 4.00	232.14	–
66	3	9	..	..	11	22	4	8	22	..	..	..	..	8	..	3	18	378.33	37.71	416.04	–
67	3	11	..	1	3	8	4	2	8	..	..	..	..	..	..	..	..	335.91	....	335.91	–
68	1	7	..	..	10	27	2	5	27	..	..	..	.	1	..	2	..	218.75	20.98	239.73	1 (Foxboro'.)
69	5	1	..	1	3	10	6	4	10	..	..	..	..	..	..	..	..	556.22	....	556.22	–
70	3	6	..	1	5	13	4	11	13	..	..	..	..	..	..	..	..	427.99	....	427.99	–

• Observation Hospital, 1 time.

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Number.	Present Age.	Sex.	Times Committed.	Offences.					Age at First Commitment.	First Sentence.		Maximum Sentence.		Last Sentence.		Times Fined.	Total Amount of Fines.	Times Paid.
				Dk.	L.	A. & B.	V.	Other.		Offence.	Penalty.	Offence.	Penalty.	Offence.	Penalty.			
71	59	M.	23	23	..	..	..	..	43	Dk.	$5.95	Dk.	9 m.	Dk.	$10.00	11	$65.85	-
72	40	M.	23	23	.	..	..	..	26	Dk.	5.00	Dk.	6 m.	Dk.	1 m.	10	75.65	-
73	61	M.	23	23	..	..	..	..	43	Dk.	5.95	Dk.	8 m.	Dk.	5 m.	13	68.49	-
74	49	M.	23	21	2	..	..	..	32	Dk.	5.95	Dk.	3 m.	Dk.	2 m.	19	106.39	-
75	51	M.	23	21	..	1	1	..	40	Dk.	5.00	Dk.	9 m.	Dk.	3 m.	17	95.00	-
76	51	M.	23	14	9	..	..	..	38	Dk.	5.00	Dk.	6 m.	Dk.	6 m.	12	115.00	2
77	57	M.	23	17	5	..	..	1	51	L.	4 m.	Dk.	6 m.	Dk.	6 m.	7	40.00	-
78	39	M.	24	24	..	..	..	..	31	Dk.	1 m.	Dk.	5 m.	Dk.	4 m.	13	70.00	1
79	45	M.	24	21	1	..	2	..	32	Dk.	$5.00	V.	6 m.	V.	4 m.	12	66.08	-
80	41	M.	24	17	2	1	3	1	20	V.	6 m.	V.	6 m.	Dk.	3 m.	14	123.70	-
81	66	M.	24	15	3	4	..	2	43	Dk.	$7.85	Dk.	9 m.	Dk.	$5.00	19	147.90	1
82	34	M.	25	25	..	..	..	..	18	Dk.	7.87	Dk.	6 m.	Dk.	5.00	18	131.12	2
83	60	M.	25	25	..	..	..	..	42	Dk.	3.10	Dk.	10 m.	Dk.	6 m.	6	40.05	1
84	47	F.	25	15	1	..	..	*9	22	I. & D.	2 m.	Dk.	8 m.	Dk.	1 m.	7	38.80	-
85	35	F.	25	21	..	1	..	3	17	I. & D.	4 m.	Dk.	12 m.	A. & B.	$5.00	12	64.60	-
86	41	F.	26	23	..	..	..	3	23	Dk.	$6.65	Dk.	6 m.	Dk.	6 m.	17	113.51	-
87	56	F.	26	24	1	..	..	1	43	Dk.	5.00	Dk.	6 m.	Dk.	6 m.	20	121.13	-
88	71	F.	26	21	..	..	4	1	58	Dk.	5.00	Dk.	12 m.	Dk.	6 m.	15	81.13	-
89	46	F.	27	25	..	..	..	2	30	Dk.	5.95	Dk.	12 m.	Dk.	3 m.	17	94.17	1
90	47	M.	27	26	1	..	..	..	23	Dk.	7.95	Dk.	5 m.	Dk.	$5.00	21	123.70	1
91	61	M.	30	30	..	..	..	..	48	Dk.	5.00	Dk.	5 m.	Dk.	15.00	28	232.10	9
92	53	F.	30	28	1	..	..	1	29	Dk.	3 m.	Dk.	12 m.	Dk.	2 m.	15	103.15	1
93	46	M.	31	30	1	..	..	..	21	Dk.	$7.95	Dk.	6 m.	Dk.	3 m.	23	160.55	3
94	41	M.	31	26	..	3	..	2	27	Dk.	7.03	Dk.	6 m.	Dk.	$5.00	18	163.69	2
95	50	F.	32	30	1	..	1	..	28	Dk.	5.95	L.	12 m.	Dk.	2 m.	19	118.00	3

* Nightwalking, 7 times; idle and disorderly, 2 times.

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Number.	Time Imprisoned at Deer Island House of Correction.									Commitments to Other County Institutions.								Actual Cost of Maintenance.			Number Times Committed to State Institutions.
	On term sentence.			For non-payment of fines.			Total time.			House of correction, South Boston.				Almshouses.				At House of Cor., Deer Isl.	At Other County Instit.	Total.	
	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.				
71	3	3	28	..	5	..	3	8	28	..	..	..	..	..	..	..	..	$328.79	....	$328.79	-
72	3	3	10	..	9	10	4	..	20	..	..	..	..	..	..	..	..	356.20	....	356.20	-
73	4	5	..	..	11	10	5	4	10	..	..	..	..	..	..	..	..	468.37	....	468.37	-
74	..	8	15	1	1	12	1	9	27	..	..	..	..	..	..	..	..	154.45	....	154.45	-
75	1	7	..	1	6	1	3	*1	1	..	..	..	..	34	6	5	11	271.11	$811.73	1,082.84	-
76	2	4	..	..	10	12	3	2	12	..	..	..	..	..	..	..	..	279.78	....	279.78	-
77	4	9	..	..	5	25	5	2	25	..	..	..	..	..	..	..	..	458.58	....	458.58	-
78	2	4	10	..	5	21	3	..	1	..	..	..	..	..	..	..	..	263.79	....	263.79	-
79	4	5	..	..	9	27	5	2	27	..	..	..	..	20	6	1	12	460.34	770.12	1,230.46	-
80	3	7	..	1	3	8	4	10	8	..	..	..	..	37	5	3	14	426.51	665.86	1,092.37	2 (Foxboro'.)
81	1	6	..	1	3	11	2	9	11	..	..	..	..	..	..	..	..	244.21	....	244.21	-
82	3	4	..	1	2	17	4	6	17	..	..	..	..	..	..	..	..	395.56	....	395.56	-
83	8	7	..	..	4	23	8	11	23	..	..	..	..	..	..	..	..	761.77	..	761.77	-
84	6	1	..	..	4	26	6	5	26	1	..	..	..	..	..	..	..	569.91	*	569.91	1 (State Hosp.)
85	5	6	..	..	7	24	6	1	24	..	..	..	..	..	..	..	..	539.51	....	539.51	-
86	2	10	..	1	..	20	3	10	20	..	..	..	..	2	..	8	26	335.13	92.93	428.06	3 (State Hosp.)
87	2	3	..	1	8	18	3	11	18	..	..	..	..	..	..	..	..	348.37	....	348.37	-
88	6	..	..	1	3	10	7	3	10	..	..	..	..	15	1	9	4	637.39	221.72	859.11	-
89	5	..	..	1	3	..	6	3	..	*9	5	4	..	3	..	8	9	547.14	891.32	1,438.46	1 (Sherborn.)
90	1	7	..	1	4	5	2	11	5	..	..	..	..	6	..	10	..	225.00	104.90	329.90	1 (Foxboro'.)
91	1	3	..	1	3	15	2	6	15	..	..	..	..	..	..	..	..	223.20	....	223.20	-
92	7	..	..	..	11	23	7	11	23	..	..	..	..	5	2	2	20	693.95	272.80	966.75	-
93	2	..	..	1	6	22	3	6	22	..	..	..	..	..	..	..	..	217.93	....	217.93	-
94	6	4	27	1	7	18	8	..	15	..	..	..	..	..	..	..	..	706.38	....	706.38	-
95	5	5	..	1	6	13	6	11	13	..	..	..	..	..	..	..	..	610.73	....	610.73	-

* Not ascertained.

Number.	Present Age.	Sex.	Times Committed.	Offences.					Age at First Commitment.	First Sentence.		Maximum Sentence.		Last Sentence.		Times Fined.	Total Amount of Fines.	Times Paid.
				Dk.	L.	A. & B.	V.	Other.		Offence.	Penalty.	Offence.	Penalty.	Offence.	Penalty.			
96.....	50	F.	32	32	..	..	..	..	27	Dk.	$12.65	Dk.	8 m.	Dk.	8 m.	24	$132.55	-
97.....	35	M.	32	21	9	1	..	1	19	Dk.	5.95	Dk.	6 m.	L.	$15.00	24	168.85	2
98.....	36	M.	32	22	4	4	..	2	18	Breaking glass.	9.95	Dk.	12 m.	Dk.	12 m.	17	207.28	-
99.....	38	M.	32	13	3	7	.	*9	20	I. & D.	6 m.	Dk.	6 m.	Dk.	6 m.	13	191.75	1
100.....	60	F.	33	33	..	..	..	..	42	Dk.	$5.95	Dk.	12 m.	Dk.	12 m.	19	102.00	1
101.....	53	M.	33	33	..	..	..	..	29	Dk.	7.85	Dk.	6 m.	Dk.	$5.00	22	141.25	3
102.....	51	M.	33	33	..	..	..	..	28	Dk.	7.95	Dk.	9 m.	Dk.	6 m.	24	135.70	1
103.....	44	M.	33	33	..	..	..	..	28	Dk.	5.95	Dk.	6 m.	Dk.	$5.00	15	96.76	-
104.....	40	F.	33	32	1	..	..	..	22	Dk.	5.95	Dk.	12 m.	Dk.	2 m.	25	133.55	-
105.....	46	M.	33	29	..	2	..	2	30	Dk.	5.75	Dk.	3 m.	Dk.	$5.00	29	172.78	2
106.....	61	M.	35	33	..	1	..	1	40	Dk. & L.	4 m.	Dk.	6 m.	Dk.	3 m.	22	124.98	1
107.....	70	F.	35	21	..	4	3	7	..	Dk.	$7.95	Dk.	12 m.	Dk.	9 m.	8	47.00	-
108.....	49	M.	35	30	3	..	..	2	18	I. & D.	2 m.	Dk.	12 m.	Dk.	$7.00	19	168.14	9
109.....	63	F.	37	37	..	..	..	..	37	Dk.	$7.95	Dk.	12 m.	Dk.	4 m.	30	190.75	1
110.....	46	M.	37	33	1	..	2	1	30	Dk.	5.95	Dk.	12 m.	Dk.	3 m.	19	140.55	-
111.....	32	M.	37	27	1	1	1	7	22	A. & B.	23.95	Dk.	12 m.	Dk.	6 m.	20	123.98	-
112.....	43	M.	37	31	2	..	4	..	19	V.	4 m.	Dk.	12 m.	Dk.	3 m.	13	75.70	1
113.....	56	F.	38	37	..	1	..	..	32	Dk.	3 m.	Dk.	12 m.	Dk.	4 m.	28	149.85	1
114.....	70	F.	39	33	3	..	1	2	52	Dk.	$5.00	Dk.	12 m.	Dk.	6 m.	18	101.85	-
115.....	42	M.	39	38	..	1	..	..	20	Dk.	3 m.	Dk.	12 m.	Dk.	6 m.	20	140.43	-
116.....	60	F.	41	40	..	1	..	..	41	Dk.	$5.95	Dk.	12 m.	Dk.	3 m.	32	174.85	-
117.....	48	M.	41	35	3	3	..	..	26	Dk.	7.95	Dk.	12 m.	Dk.	5 m.	21	132.18	-
118.....	48	M.	42	42	..	..	..	..	30	Dk.	3.10	Dk.	6 m.	Dk.	$10.00	35	203.20	-
119.....	52	M.	43	42	..	..	..	1	37	Dk.	5.95	Dk.	12 m.	Dk.	5.00	31	177.60	1
120.....	46	F.	43	36	3	4	..	..	20	Dk.	5.85	Dk.	12 m.	Dk.	2 m.	26	206.53	-

* Idle and Disorderly, 7 times.

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Number.	Time Imprisoned at Deer Island House of Correction.									Commitments to Other County Institutions.								Actual Cost of Maintenance.			Number Times Committed to State Institutions.
	On term sentence.			For non-payment of fines.			Total time.			House of correction, South Boston.				Almshouses.				At House of Cor., Deer Isl.	At Other County Instit.	Total.	
	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.				
96.....	4	2	..	1	5	10	5	7	10	7	•	..	..	..	..	..	..	$488.40	•	$488.40	-
97.....	1	11	..	1	8	2	3	7	2	..	..	..	..	..	..	..	..	286.72	....	286.72	-
98.....	8	..	10	1	11	8	9	11	18	13	5	1	..	1	..	2	21	868 43	$794.81	1,663.24	-
99.....	6	9	5	1	4	..	8	1	5	..	..	..	..	..	..	..	..	710.68	....	710.68	-
100.....	7	2	..	1	1	28	8	3	28	..	..	..	..	20	5	1	16	307.76	636.93	944.69	-
101.....	4	5	2	1	6	2	5	11	4	..	..	..	..	..	..	..	..	513.69	....	513.69	1 (Foxboro'.)
102.....	3	3	15	1	8	26	5	..	11	..	..	..	..	11	1	3	16	441.88	162.92	604.80	-
103.....	6	9	..	1	..	16	7	9	16	3	•	..	..	2	..	2	26	687.65	29.99	717.64	-
104.....	5	4	..	1	6	6	6	10	6	..	..	..	..	..	..	..	..	549.20	....	549.29	-
105.....	..	11	..	1	10	23	2	9	23	..	..	..	..	..	..	..	..	141.31	....	141.31	-
106.....	3	4	..	1	7	18	4	11	18	..	..	..	..	..	..	..	..	429.18	....	429.18	-
107.....	8	8	..	..	7	3	9	3	3	..	..	..	..	..	..	..	..	811.41	....	811.41	-
108.....	6	8	5	1	2	10	7	10	15	..	..	..	..	..	..	..	..	685.35	† 5.50	690.85	-
109.....	2	9	..	2	2	1	4	11	1	..	..	..	..	16	..	10	4	425.12	106.30	531.42	1 (Insane Asyl.)
110.....	6	9	9	1	7	16	8	4	25	..	..	..	..	..	..	..	..	738.05	....	738.05	-
111.....	8	10	..	2	4	20	11	2	20	..	..	..	..	..	..	..	..	984.49	....	984.49	-
112.....	11	1	..	..	9	10	11	10	10	..	..	..	..	..	..	..	..	1,035.54	....	1,035.54	-
113.....	2	4	..	1	9	3	4	1	3	..	..	..	..	..	..	..	..	358.80	....	358.80	3 (State Hosp.)
114.....	10	..	15	1	7	10	11	7	25	..	..	..	..	4	1	..	9	1,019.08	129.03	1,148.11	-
115.....	6	5	..	1	5	2	7	10	2	..	..	..	..	..	..	..	..	628.40	....	628.40	-
116.....	5	1	..	2	..	10	7	1	10	..	..	..	..	..	..	..	..	624.02	....	624.02	-
117.....	7	3	..	1	5	1	8	8	1	..	..	..	..	23	3	..	12	756.48	381.90	1,138.38	-
118.....	2	1	..	2	8	10	4	9	10	..	..	..	..	..	..	..	..	419.67	....	419.67	1 (Concord Ref.)
119.....	4	4	15	1	6	18	5	11	3	..	..	..	..	..	..	..	..	520.49	....	520.49	-
120.....	9	3	..	2	..	11	11	3	11	1	•	..	..	15	2	1	27	1,007.16	271.47	1,278.63	1 (Sherborn.)

• Not ascertained. † Observation Hospital at Deer Island, 2 times.

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Number.	Present Age.	Sex.	Times Committed.	Offences.					Age at First Commitment.	First Sentence.		Maximum Sentence.		Last Sentence.		Times Fined.	Total Amount of Fines.	Times Paid.
				Dk.	L.	A. & B.	V.	Other.		Offence.	Penalty.	Offence.	Penalty.	Offence.	Penalty.			
121.....	50	F.	46	45	1	..	..	..	34	Dk.	$5.95	Dk.	12 m.	Dk.	4 m.	33	$174.50	-
122.....	54	M.	46	45	..	1	..	..	33	Dk.	6.85	Dk.	12 m.	Dk.	2 m.	34	175.25	2
123.....	36	M.	47	39	7	..	..	1	23	Dk.	7.95	Dk.	12 m.	L.	3 m.	29	192.70	-
124.....	48	M.	49	35	8	3	1	2	28	Dk.	7.99	L.	8 m.	Dk.	6 m.	36	277.52	-
125.....	50	F.	49	49	..	..	..	..	30	Dk.	7.85	Dk.	12 m.	Dk.	1 m.	32	158.69	1
126..	65	M.	49	17	18	6	3	5	49	Dk.	12.45	Dk.	6 m.	L.	1 m.	23	323.52	-
127.....	56	M.	53	43	..	5	..	5	30	Dk.	2 m.	Dk.	12 m.	Dk.	6 m.	33	218.17	4
128.....	41	F.	55	53	..	..	..	2	16	Dk.	$4.52	Dk.	12 m.	Dk.	4 m.	41	247.26	1
129.....	56	M.	57	53	2	2	..	..	34	Dk.	7.95	Dk.	12 m.	Dk.	$5.00	40	278.45	8
130.....	45	M.	58	58	..	..	..	..	20	Dk.	9.57	Dk.	11 m.	Dk.	5 m.	42	273.71	1
131.....	52	F.	58	58	..	..	..	..	22	Dk.	7.95	Dk.	12 m.	Dk.	5 m.	44	289.10	-
132.....	44	M.	58	57	..	..	..	1	20	Dk.	9.37	Dk.	12 m.	Dk.	5 m.	41	252.88	1
133.....	45	F.	59	56	2	..	1	1	20	Dk.	7.95	Dk.	12 m.	Dk.	3 m.	44	277.50	-
134.....	64	M.	61	60	..	..	..	1	41	Dk.	8.95	Dk.	6 m.	Dk.	$10.00	50	281.15	1
135.....	48	F.	68	65	..	3	..	..	20	Dk.	10.62	Dk.	* 18 m.	Dk.	5.00	45	336.19	-
136.....	50	M.	75	74	..	..	..	1	19	Dk.	6 m.	Dk.	12 m.	Dk.	5 m.	45	317.65	6
137.. ...	75	M.	76	75	1	..	..	..	52	Dk.	$9.37	Dk.	11 m.	Dk.	$5.00	52	323.33	-
138.....	68	M.	76	73	1	2	..	..	39	Dk.	6 m.	Dk.	12 m.	Dk.	4 m.	58	369.29	2
139.....	67	M.	102	100	1	..	1	..	42	Dk.	$5.95	Dk.	12 m.	Dk.	$5.00	78	461.51	1
140.....	73	F.	125	123	..	..	2	..	44	Dk.	10.15	Dk.	12 m.	Dk.	12 m.	96	633.05	2

* On two counts.

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Number.	Time Imprisoned at Deer Island House of Correction.									Commitments to Other County Institutions.								Actual Cost of Maintenance.			Number Times Committed. to State Institutions.
	On term sentence.			For non-payment of fines.			Total time.			House of correction, South Boston.				Almshouses.				At House of Cor., Deer Isl.	At Other County Instit.	Total.	
	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.	No.	Yrs.	Mos.	Dys.				
121.....	5	8	..	2	3	10	7	11	10	..	..	..	..	..	..	..	..	$697.86	....	$697.86	–
122.....	4	7	..	2	4	5	6	11	5	..	..	..	..	..	..	..	..	601.78	....	601.78	–
123.....	5	..	1	2	3	5	7	3	6	..	..	..	..	..	..	..	..	623.83	....	623.83	–
124.....	4	10	..	2	6	10	7	4	10	..	..	..	..	..	..	..	..	644.07	....	644.07	–
125.....	5	9	..	2	6	5	8	3	5	3	1	6	25	..	..	..	..	662.55	$238.21	900.76	1 State Hosp. 1 Sherborn.
126.....	5	10	..	3	1	..	8	11	..	..	..	..	..	..	..	..	..	776.28	....	776.28	–
127.....	8	4	..	2	11	2	11	3	2	..	..	..	..	2	..	..	24	986.87	8.31	995.18	–
128.....	6	11	..	3	2	27	10	1	27	..	..	..	..	..	..	..	..	891.63	....	891.63	–
129.....	6	..	..	2	..	18	8	..	18	..	..	..	..	..	..	..	..	707.10	....	707.10	–
130.....	6	5	..	2	10	13	9	3	13	..	..	..	..	..	..	..	..	812.79	....	812.79	–
131.....	6	2	..	3	6	8	9	8	8	..	..	..	..	..	..	..	..	846.00	....	846.00	–
132.....	6	..	..	2	10	10	8	10	10	..	..	..	..	..	..	..	..	778.39	....	778.39	–
133.....	6	..	..	4	6	9	10	6	9	..	..	..	..	1	..	1	24	924.57	11.89	936.46	–
134.....	4	..	..	3	1	2	7	1	2	..	..	..	..	24	3	4	22	622.11	427.30	1,049.41	6 (State Hosp.)
135.....	8	7	..	3	10	27	12	5	27	..	..	..	..	3	..	10	..	1,097.25	104.90	1,202.15	–
136.....	12	..	8	2	10	11	14	10	19	1	*	..	..	3	1	2	28	1,301.24	156.57	1,457.81	1 (Concord Ref.)
137.....	4	4	..	3	10	10	8	2	10	..	..	..	..	..	..	..	..	765.31	....	765.31	–
138.....	8	1	..	4	3	18	12	4	18	..	..	..	..	..	..	..	..	1,054.20	....	1,054.20	1 (State Hosp.)
139.....	9	6	..	4	6	5	14	..	5	..	..	..	..	..	..	..	..	1,231.10	....	1,231.10	–
140.....	15	8	..	6	10	15	22	6	15	..	..	..	..	2	..	2	14	1,976.36	25.82	2,002.18	–

* Not ascertained.

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MISCELLANY AND NOTICES.

THE FIFTY-EIGHTH REGISTRATION REPORT OF MASSACHUSETTS.

Fifty-eighth Annual Report of Births, Marriages, and Deaths in Massachusetts for the year 1899. Prepared by the Secretary of the Commonwealth. Edited by Francis A. Harris, M.D. Boston, 1900; pp. 215.

The defects of the registration report for 1899 may be classified under three heads,— typographical mistakes, arithmetical blunders and errors of judgment in the handling of the material. Mistakes of the first sort are made obvious by sudden breaks in the uniformity of a series of figures, without any adequate reason. The laws which control vital phenomena are as immutable as those which regulate the movements of the planets; and statisticians recognize an abrupt deviation from an otherwise harmonious series of observations as a sign that the calculations require revision. Thus on page 140 of the Massachussetts report, in a table of the "Average Ages at Marriage from 1880–1899," we find that the average age of all brides has gradually and very slowly increased, and, during the whole period, with the exception of two years, has varied only from 25.0 to 25.8. The recorded rates for the two years mentioned, 1895 and 1897, are, however, 23.2 and 24.8, respectively; and any one familiar with vital statistics would look upon these figures with suspicion, in the absence of any editorial comment in explanation of such abnormalities. Similarly the average age of women marrying for the first time has not fallen below 24.1 or risen above 24.5, since 1884, except in 1894, when the probably erroneous figure of 23.7 is recorded. There is an apparent mistake of the same sort in the average age of all bridegrooms for 1881, but this is copied from older reports and cannot be charged to the present editor. In the table of "Living Births" by months, quarters and periods of six months, on p. 128, are

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three similar deviations, one, the births for January, 1884, and two in recent years, the births for January, 1896, and for November, 1897. If these are errors either in registration or computation they must vitiate all the general averages at the foot of the table. There is an infelicitous bit of English on this last page, in which we are informed that for the two years, 1895 and 1896, "the deaths from unspecified dates are excluded." Unspecified dates must, no doubt, be unwholesome; but it seems reasonable to exclude such deaths from a table of "Living Births." The table of "Births and Birth-rates by Counties," on p. 126, furnishes a more serious error. Here the birth-rate of Essex county in 1895 is given as 34.74, while Suffolk has only 31.06; and the editor comments on this fact on page 124, noting that "The birth-rates present considerable variations, Essex county having the the highest." Anyone familiar with vital statistics knows that, in this country, rural birth-rates are always lower than those of urban districts, and that such a condition as that described is incredible. A comparison of the number of births in Essex county, given on p. 126, with the population as given on p. 2, shows that this 1895 birth-rate should be 24.23 and not 34.74.

The errors of the second class mentioned, the errors of calculation, are generally due to a neglect of the arithmetical principle that the average of a series of ratios is not the same thing as the ratio between the sums of the two sets of terms from which the first ratios were calculated. To add together the death-rates of Boston and Brookline and divide by two would not give the death-rate of the combined population. When the base for the calculation of a series of ratios is nearly the same the averaging of ratios is often practiced, although theoretically improper, without gross error. The rates for successive years in the same district are frequently averaged in this manner, and the tables of birth-rates on p. 123 and of death-rates on p. 165 have at least the sanction of common practice. This principle, however, is strained rather far on p. 147, where it is applied to more variable factors, like the marriage-rates for a period of ten years. And in the table of plural births on p. 134 its application to such extremely variable factors as the ratio of living births to cases of twins and triplets is quite inadmissable. The average ratio of living births to one case of twins for the twenty years 1880-99 is given by the editor as 109.6; and the average ratio to one

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case of triplets as 12229.8. These are the averages of the ratios; but not the average ratio, which any reader would take them to be. The true rates for the twenty years as calculated from the number of plural births, and the total number of living births, given on p. 122, are 107.6 and 10026.6, showing the error of the editor's method to be about 20 per cent in the latter case. There is some curious mistake in calculation in the table showing the nativity of children born, on p. 132. Three columns are given representing the percentages of children born of native parents, of foreign parents, and of one native and one foreign parent. Up to 1897 the total of the three columns equals one hundred per cent; but for 1898 it is only 99.61, and for 1899 it is 99.71. In the tables of births and birth-rates by months and quarters, on p. 127, the results given are most misleading because no allowance is made for the number of days in the month. Thus the "monthly percentage of births" is given as 7.7 for February and 8.3 for October, and the editor states that "the least number of births occurred in February." If the average daily number of births be calculated, as should of course be done, the February rate is found to be 193, in excess of April with 181, May with 177, June with 185 and October with 189.

The defects of the Massachusetts Registration Report are, however, more deep-seated than is indicated by such errors in detail. Since its publication was taken out of the hands of experts in 1890 no attempt has been made to keep pace with the advance of science. The present report in comparison with those of other progressive states is archaic and incomplete. In 1890 it was already obvious that the subject of municipal statistics was of all questions the one most deserving the attention of the student of the future, and a good beginning in the tabulation of such data was begun. Since that time no new steps have been taken, except the backward one, of dropping the large towns from Supplement A to Table 8, p. 36. Even the cities were not included between 1891 and 1897. In the 1899 report as a whole there are twenty-eight tables of county statistics and only four tables of the statistics of cities and towns. As the county is a purely artificial division the former tables have no practical significance whatever, and even their sentimental interest is today small. The value of the tables which are given is

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impaired by the omission of data needed to interpret the figures recorded. Thus no ratios are calculated for the tables of births on p. 18; no populations are included in the table of births by cities on p. 21; and the annual rate of increase is omitted from the table showing the change in the population of the state on p. 121. The ratio of divorces to marriages on p. 147 is misleading The number of divorces should be referred to the number of marriages eleven years before (as the average period before divorce is eleven years), or to the total married population. The nosological classification of the causes of death is antiquated and unscientific, being, as stated, "with slight modifications, identical with that embodied in a report drawn up by William Farr, Esq., M.D., of London, for the consideration of the International Statistical Congress, which met at Paris in September, 1855." In spite of the obvious advantages of uniformity with the past it is at least questionable whether more than "slight modifications" are not needed to bring the system into harmony with medical science in 1899! The table on p. 178 giving the percentage of causes of death by the classes of disease, Zymotic, Constitutional, Local, etc., is another relic of the past. The publication of such a table in 1890 was perhaps excusable; in 1899 students of vital statistics knew that the use of these group death-rates is wholly vicious and that such a table is valueless.

The comparative birth-rates, marriage-rates and death-rates in various foreign countries, given on pages 124, 143 and 167, respectively, and taken from Dr. Mayo-Smith's text-book on Statistics and Sociology, are very good for the period prior to 1894. A reference to current statistical literature, however, would furnish more recent and therefore more strictly comparable data. The figures for the year 1894, indeed, may be found in the 1898 Report of the Mass. State Board of Health. The figures for the population of of the State at the different age periods in 1890 are omitted from the table on p. 174, and in speaking of this the editor remarks: "It is to be regretted that the materials for 1890 could not be found to complete the table." This statement has been printed with regularity since 1895, but the desired figures were published by the U. S. Census Bureau in 1897 and may be found in the Report on Population of the United States at the Eleventh Census, 1890, Part II, p. 44.

C.-E. A. WINSLOW.

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NOTES ON VITAL STATISTICS.

Dr. Fr. Prinzing's essay on *Die Kindersterblichkeit in Stadt und Land*, published in the November, 1900, number of the *Jahrbücher für Nationalökonomie und Statistik*, is a splendid bit of research and will be a classic in the study of infantile mortality. The author first reviews the literature on the subject and then proceeds to an elaborate analysis of the statistics of the various states and districts of the German Empire and Austria-Hungary, comparing each city with the rural districts adjacent. In Prussia, with the exception of Berlin and Hohenzollern and a few other provinces, the infantile death-rate is higher in the city than in the country. The totals for the kingdom are as follows: —

DEATHS OF CHILDREN UNDER 1 YEAR TO 100 BIRTHS, IN PRUSSIA, 1893-97.

	In the cities.	In the country.	Total.
All children	21.4	19.5	20.2
Legitimate children	19.7	18.5	18.9
Illegitimate children	37.3	33.2	35.1

The still-births are next considered, and the fact that the still-births among illegitimate children are almost universally higher in the city, while among legitimate children the country shows a slight excess, is explained by the fact that in the city the mothers of illegitimate children more often conceal their pregnancy and continue to do hard work, while in the country such a condition sometimes merely precedes delayed marriage. The care displayed by Dr. Prinzing in all these detailed analyses cannot be too highly praised. In studying, for instance, the deaths during the separate months of the first year, he does not refer all deaths to the number born, but subtracts the number dying each month from the infant population before calculating the rate for the next month. The following table is calculated on this basis: —

DEATHS OF CHILDREN IN PRUSSIA PER 100 LIVING AT THE CORRESPONDING AGE PERIOD. (LEGITIMATE CHILDREN, 1893-97.)

Month.	Country.	Cities in General.	Cities with Over 20,000 Inhabitants.	Berlin.
1	5.98	5.32	5.12	5.30
2	2.30	2.34	2.36	2.36
3	1.92	2.14	2.19	2.22
4-6	4.23	5.02	5.22	5.33
7-9	3.13	3.74	3.85	4.03
10-12	2.48	2.94	3.08	3.26

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Evidently the rural conditions are more adverse in the first month of life while those of the city are less favorable after that period. From a study of the statistics as far back as 1876 it appears that the conditions in the country have remained fairly constant while the city death-rates, at first extravagantly high, have been gradually reduced almost to the rural level. The Prussian table may again be quoted: —

DEATHS IN PRUSSIA PER 100 LEGITIMATE BIRTHS.

Year.	Country.	All Cities.	Large Cities Except Berlin.	Berlin.
1876–80	18.3	21.1	23.8	27.1
1881–85	18.6	21.1	23.7	25.4
1886–90	18.7	21.0	21.9	24.1
1893–97	18.5	19.7	20.8	20.5

In Saxony there is little difference between the city and country rates, but the former are a trifle lower. In Bavaria the same thing is true to a marked degree, while the smaller German states vary, some resembling Prussia and some Bavaria. The author next proceeds to the consideration of affairs in Austria-Hungary. Here there is an almost universal excess of the rural over the urban infantile death-rate, and this is especially true if the first month of life only be considered. For example, the following table may be cited: —

DEATHS PER 100 LIVING AT THE BEGINNING OF EACH AGE PERIOD

Age, months	1	2	3	4–6	7–9	10–12
Vienna	7.37	2.77	2.42	5.02	4.06	3.56
Lower Austria (without Vienna)	10.44	3.59	3.23	6.12	4.27	3.44

Finally, Dr. Prinzing reviews the statistics of other European countries: In Switzerland the rural and urban rates are, approximately, equal; in France the cities show a markedly lower infantile death-rate; in Belgium, the Netherlands, England, Sweden, and Finland, on the contrary, the city rate is higher. Seventy Belgian cities gave 17.5 per cent of deaths under 1 year, while the rest of the country gave 14.9 per cent; 12 cities of the Netherlands gave 17.0 per cent, and the rest of the country 15.4 per cent; the rate for

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England and Wales was 14.2, and for 28 English cities, 16.1; Stockholm gave 17.0 per cent, and the adjacent country, 10.8; the cities and the country of Finland had rates of 19.6 and 15.8, respectively. In discussing the conflicting figures and their interpretation the author suggests three factors as most markedly influencing the infantile death-rate: the food of the child, principally milk; the protection of the child against cold; and the general intelligent care with which it may be surrounded, including the advantage of medical attendance. The first factor, the milk supply, is most important in the city and where it is potent the urban death-rate will exceed that of the rural districts. The general care of the child and its protection against cold is, on the contrary, least adequate in the country. These suggestions are borne out by certain statistics in which Dr. Prinzing shows that while diarrhœal diseases of children are most fatal in the cities, whooping-cough is constantly most fatal in the country. It may be noted that tuberculosis is higher in the cities as might be expected. In his final summing up the author points out that the question as to the relation of infantile mortality in city and country cannot be answered off-hand. In most of Prussia, and in certain other North German states, as in England, Sweden, and other northern countries, the city death-rate is the higher; in South Germany, and Austria-Hungary the reverse is the case. The urban mortality is, however, decreasing more rapidly that that of the rural districts, so that in North Germany the difference between the city and country rates is diminishing. The excess of deaths in the country is due mainly to causes acting during the first month of life. Whether, as Dr. Prinzing believes, high city death-rates are due to the calling of nursing mothers away from their children by professional duties, and high country death-rates are caused by a poor artificial food supply for children not nursed by their mothers, seems open to grave question. The essay considered from a statistical standpoint is above criticism, and forms a memorable contribution to sanitary literature.

Dr. E. W. Hope, medical officer of Liverpool, publishes a brief paper on "Infantile Mortality" in *The Journal of State Medicine* for March, 1901. He fixes 100 deaths per 1000 children under 12 years of age as a fair maximum for the non-preventable rate of infant

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mortality and discusses the causes producing an excess of this figure. In Liverpool, during 1899, the death-rate under 1 year per 1000 births was 1.98. A detailed study showed that the excessive death-rates were sharply localized. One ward showed a rate of 1.36 and another of 2.74; and in 1082 families there were 2229 deaths under 1 year to only 4574 births. Dr. Hope states that the death-rate under 3 years of age is fifteen times as great among children fed on artificial food as among those fed only at the breast. It is unfortunate that so many general statements are made in this article without the detailed figures upon which they are founded. In connection with the subject of milk supply, the reviewer would call the attention of anyone not familiar with the *Statistisches Jahrbuch der Stadt Berlin* to the invaluable statistics published by Dr. Böckh in that publication. The registration of the source of food supply of almost the entire infant population of Berlin makes it possible to calculate separately the death-rates of each class of feeding. Thus, in 1896, the deaths per million, according to the method of feeding, were as follows: —

	Mothers' Milk.	Animal Milk.	Milk Substitutes.
Under 1 month . . .	19.14	111.09	308.0
" 1 year	5.66	32.89	83.14

The fact that putrifying animal milk and not animal milk *per se* causes most of the trouble is shown by the following table from the Year-book for 1897. Here, of course, the figures for the different columns are not comparable, but only the upper and lower rates: —

AVERAGE DAILY NUMBER OF DEATHS OF CHILDREN UNDER ONE YEAR OF AGE ACCORDING TO SOURCE OF FOOD SUPPLY.

	Mothers' Milk.	Animal Milk.	Substitutes.
Three summer months . . .	2.64	33.40	1.16
Nine other months	2.57	13.19	0.25

Professor P. E. Fahlbeck's study of "La Noblesse de Suède" in Part 1 of Vol. XII of the *Bulletin de l'Institut International de Statisque* is a careful study of the statistics of a social class. Since 1826 all Swedish families with claim to noble rank have been registered as members of a "Maison de la Noblesse" with detailed genealogical records. Of the total of 3033 families thus registered 2324, or 76.7 are now extinct. It is with these extinct noble families that the author concerns himself. He presents first a table of *family-mortality* as follows: —

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NUMBER OF FAMILIES BECOMING EXTINCT OUT OF 1,000 FAMILIES PERSISTING AT BEGINNING OF EACH AGE-GROUP.

Age of family, years	0–25	26–50	51–75	76–100	101–125	126–150	151–175	176–200	201–225
Families of simple nobility	203	214	180	159	170	137	140	109	30
Families of counts and barons	236	175	148	124	91	69	....	....	....

The figures for the later age period, where the number of cases was too small to give average results, are omitted. The striking thing about this table is the rapid extinction of families in the second and third generation, followed by a greater and greater persistence of the surviving races in each succeeding period. Estimating not by years, but by generations, it appears that 84 per cent of the families for which the figures were complete were extinguished in the third generation, and only two out of 1547 persisted in the ninth. Some of the factors contributing to these general results are then considered in detail. Considering only those families which lasted for from two to six generations, M. Fahlbeck finds that the ratio of males married to adult males, and the ratio of fertile marriages to all marriages were low throughout but took a sudden drop in the last generation. For instance, the per cent of sterile marriages to total marriages in the families of five generations was 18.31 in the first, 17.29 in the second, 23.08 in the third, 21.36 in the fourth, and 75.00 in the fifth; in the families of six generations the figures ran as follows: 10.26, 10.00, 19.35, 14.29, 17.07, 70.00. These two tables do not seem to the reviewer especially significant, because the mere fact of a generation being the last, implies celibacy and sterility in a high degree. Again, a table showing a steadily falling number of living children born of each fertile marriage may indicate merely the well-known effect of high civilization and complex social conditions. On the other hand, the fact that the deaths of males under 19 years of age to the living males of that age period has steadily increased is of interest. In the five-generation families this percentage has risen steadily from 17.57 to 43.41, and in the six-generation families from 24.42 to 38.30. Finally, the ratio of female to male children born has increased with remarkable uniformity, as seen in the table below. This condition, probably indicative of a lowered vitality, as well as the increased

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death-rate, does seem to bear out the conclusion of the author that the figures show the effects of degeneracy. It is unfortunate that the persisting noble families were not studied for comparison. There are two factors in the class considered,— social conditions and biological conditions. The living families may show the same traits only in a less advanced stage of development; or, on the contrary, the traits noted may be due to the selection of the eliminated weaker stocks, and the existing families may not be decreasing in vitality. General observation would, of course, support M. Fahlbeck's assumption that the phenomena observed are typical of the social conditions.

NUMBER OF MALES TO 100 FEMALES BORN ALIVE.

Families of	Generations.				
	II.	III.	IV.	V.	VI.
Two generations	99.41				
Three "	111.71	87.40			
Four "	127.71	116.73	79.08		
Five "	129.08	120.15	109.62	83.23	
Six "	159.26	107.92	111.54	101.75	69.12

The high figures in the earlier generations are probably due to failure to record female births.

A. N. Kiær in the *Bulletin de l'Institut International de Statistique*, Tome XII, Livraison I, urges the importance of an investigation of the population of the less-known reigions of the globe and its composition. He suggests the study of zones, carefully selected as typical, for an estimate of the demography of each region, and applying his method to Norway, finds that the population of six zones minus the cities is 256,443, giving 1,057,070 for the rest of the country, while the true population is 1,104,639. M. Kiær recommends the establishment of an International Bureau in Switzerland for carrying out such censuses in countries not under the control of the civilized powers. In the same publication is a paper by Dr. J. Körösi entitled "Beitrag zu einer einheitichen Aufarbeitung der Geburtsstatistik" which shows forcibly some flaws in the statistical system of some, even of the most advanced countries. He gives in tabular

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form a view of the statistics relating to births available for the European states. It appears from this table that birth-rates of the separate sexes by months are not available for France, that still-births are not recorded in England and Ireland and are not distinguished from the living-births in Scotland, and that in Portugal and Russia the illegitimate still-births and living-births are combined. Births according to religion are recorded in ten of the twenty-two states considered, and according to nationality only in two.

An article by A. Coste in the January number of the *Journal de la Société de Statistique de Paris* on "Les Lois de la Population d'après M. Gustave Cauderlier" is mainly a review of a volume published by the latter at Brussels and entitled "Lois de la Population et leur application à la Belgique." It appears that M. Cauderlier wishes to modify the third law of Malthus, according to which moral constraint, vice and misfortune are the forces which keep a population down to the level of the means of subsistence by substituting therefor the forces of emigration, voluntary decrease in marriages, and voluntary or involuntary decrease in female fecundity. He has compiled a large amount of statistical material relating to France, England, Scotland, Ireland, Belgium, Holland, and Prussia, and covering a period of fifty years. The general movement of population in Europe appears to show rising marriage, birth and death-rates before 1875 and falling rates after that time. The table illustrating this point for four states is constructed by M. Coste by the remarkable process of adding together the twenty individual rates representing five different years in the four countries. Such figures are, of course, utterly valueless; and this misuse of statistics is in striking contrast with the precautions taken by Cauderlier himself. The main value of the latter's work consists in the fact that after giving the usual rates referred to population, he re-calculates the whole of his tables on a more scientific basis, referring the marriages to the number of single women between 15 and 50 years, the legitimate births to the number of married women between 15 and 50 years, and the deaths of individuals between 20 and 25 years to living persons of that age.

Few statistical questions are in a less satisfactory state than that one just considered, concerning the method of expressing the marriage rates. M. Cauderlier suggests a further refinement in an extension

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of his views on Malthusianism in the March number of the *Journal de la Société de Statistique de Paris* entitled "Etude sur les lois de la population et la loi de Malthus" in which he points out that even the reference of the number of marriages to the female population between the ages of 15 and 45 is not always accurate. He shows that a rate so calculated is affected by the social conditions governing the age at which marriage occurs, and by the frequency of marriages during the years previous, because the number of marriages will really depend not upon the total number of persons — but upon the number of unmarried persons — between 15 years and 45. For example, the ratio of marriages to female population of the given age in 1881 was 66.70 per 1000 in France, and 55.49 in Belgium. On the other hand, if the number of marriages is referred to the number of women reaching each year the mean age of marriage (25.5 years in France, 28.5 years in Belgium), the relations are reversed, the French rate being .869, and the Belgian rate .946. Considering the smaller population and the lessened fecundity at the more advanced age it seems to the reviewer a question whether the former ratio is not really the more significant. Better than any ratio perhaps would be the graphic method which has proved so instructive as applied to mortality statistics by Pearson.

Valuable additions to the statistical literature of antitoxin have been made in two recent numbers of the *Centralblatt für allgemeine Gesundheitspflege*. In the seventh and eighth parts of Vol. XIX, 1900, Dr. J. Weissenfeld, of Bonn, compares the death-rates from diphtheria and scarlet fever for a period of years in various European states. He notes the possible error introduced in the comparison of fatality statistics by the fact that light cases of diphtheria, which might often have passed unnoticed, are now reported in order to secure antitoxin treatment. His own figures are derived from the *Veröffentlichungen des k. Gesundheits-Amtes* and cover ten years in the foreign countries, twenty years in the German states, and thirty years in certain German cities. In almost every instance the rates for dipththeria and croup show a gradual decrease, with individual variations; and a sudden drop in 1895, when the use of antitoxin became general. The only exception is in the case of England, where the introduction of antitoxin in private practice has been very

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slow, and where the death-rate before 1895 was so low as to indicate a widespread natural immunity against the disease. This sharp decrease is not shown by the scarlet fever statistics except, curiously enough, in England. The most striking table given by Dr. Weissenfeld is the following: —

DEATHS FROM DIPHTHERIA AND CROUP PER 10,000 POPULATION.

Year.	Germany.	Austria.	Belgium.	France.	Netherlands.	Switzerland.	England.
1889	10.9	7.11	3.87	6.58	....	5.96	2.58
1890	10.1	7.35	3.71	6.11	....	7.65	2.42
1891	8.5	8.83	3.31	6.05	4.95	8.20	2.14
1892	9.7	9.49	2.65	5.42	4.46	5.20	2.55
1893	12.6	9.56	4.03	5.48	4.05	10.20	4.31
1894	10.2	10.20	4.59	4.07	3.31	8.00	3.79
1895	5.4	6.28	2.86	1.95	1.45	3.40	3.52
1896	4.3	4.92	1.59	1.85	2.47	3.37	3.86
1897	3.5	4.69	1.31	1.25	2.24	2.97	3.14
1898	3.4	3.85	1.41	1.22	1.71	3.71	3.09

The second paper referred to is by Dr. V. Dovertie, and consists of a comparison of the diphtheria and scarlet fever death-rates in the Swedish cities. From 1861 to 1894 the death-rate from diphtheria and croup ranged from 4.1 to 12.4; for the years 1895–99 the figures are 4.5, 2.6, 2.7, 4.2, and 6.7; and the average for 1895–99 is 4.2, considerably lower than that for any previous five-year period. The scarlet fever death-rate, however, shows a much more striking diminution than that from diphtheria. Before 1895 it ranged from 3.2 to 17.6; since 1895 the highest rate has been 1.5, and the average for 1895–99 is 1.4. This sudden decrease is very curious. It must, however, be connected with the fact that the scarlet fever rate before 1895 was abnormally large. The minimum death-rate given by Dovertie for a five-year period before 1885 is 5.4 and the highest 12.5.

No. IV of Vol. I of the *Boletin Demografico Argentino*, published by the Minister of the Interior of the Argentine Republic for October, 1900, contains reviews of the movement of population in the city of Rosario de Santa Fé from 1730 by Gabriel Carrasco, and in the city of Corrientes from 1800 by Cayetano Ripoll, and

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a paper on tuberculosis in the city of Buenos Aires also by Carrasco. The latter study covers the period from 1872 to 1899, and the author shows that while the general death-rate, per 10,000 inhabitants, fell from 292 in 1872–74 to 247 in 1890–94 the tuberculosis rate decreased from 32 to 22. Of late, however, the improvement has not continued. The general death-rate fell to 191 in 1895–99, but the tuberculosis rate remained 21, or over 10 per cent of the total mortality. An analysis by districts shows that in certain parishes the tuberculosis deaths have amounted to 38 and 42 per 10,000 inhabitants, the high death-rates corresponding in general with poor sanitary conditions. A study of the monthly variations shows that pulmonary tuberculosis attains a maximum in November, while plots of the humidity and temperature show almost parallel curves to that of the disease but with later maxima, in December and January, respectively. The Rosario statistics include records of births, deaths and marriages from the parish books back to 1730, when there were 15 births, 7 marriages, and 4 deaths. The movement of the population since 1880 is indicated on a chart notable for a picturesque symbolism. Each point on the curve of natality is marked by a circle including a child's face, while the mortality curve has a death's head at each point. For marriage curves Dr. Carrasco uses a circle enclosing two hearts pierced by an arrow, and for divorces a circle with two clenched fists. The most significant figures in the Corrientes' tables are those columns which show the legitimate and illegitimate births from 1800. The average yearly number of legitimate births in 1800–04 was 273, and of illegitimate births the average was 125. In the period 1815–20 the figures were 162 and 141; ten years later the illegitimate births began to be in excess; in 1825–29 there were 101 legitimate births and 142 illegitimate; in 1845–49 the averages were 175 and 301; and in 1895–99, 304 and 682. Presumably, as in the case of the West Indian Islands, the large proportion of illegitimacy is the result of the excessive marriage fees which lead many persons, not of otherwise irregular lives, to live together without the religious ceremony.

The Milroy Lectures on "Public Health and Housing," delivered by Dr. J. F. J. Sykes, and published in *The Lancet* for March 2, 1901, include a good summary of the principal statistics available on

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the subject of overcrowding. The author begins with the table published thirty years ago by Dr. Farr in support of his formula, according to which the mortality of a district was nearly as the eighth root of the density of the inhabitants, and adds Dr. Tatham's table, and statistics for Berlin, certain Scotch cities, Glasgow, Baden, some European cities, and several districts of London. The following figures for certain districts in the latter city, in 1888–90, are of interest: —

	Boundary St. Area.	St. Matthew, Bethnal Green.	London.	Churchway Area.	Somers Town.	St. Pancras.
Density population per acre	373	168	58	446	183	88
Death-rate per 1,000 population	39.3	22.5	18.9	37.4	23.1	19.1
Death-rate under 1 year per 1,000 population	252	159	151	393	172	153

In all such statistics it must be remembered that many factors enter into the problem. Besides the bad air and the opportunity for the spread of infection, implied in overcrowding, many correlated disadvantages, such as poor protoplasm, poor food, intemperate habits, etc., are likely to increase the death-rate in tenement population. For this reason the most significant table quoted by Dr. Sykes is that which relates to the sanitary condition of the British army, the different arms of which organization differed, as is stated, only in the amount of overcrowding in barracks. The only change in the environment of the troops between the two periods considered was an increased cubic air space per head.

MORTALITY FROM LUNG DISEASES.

	1837–46.	1864–70.
Household Cavalry	6.28	3.76
Cavalry of the Line	5.65	1.41
Foot Guards	11.90	2.30
Infantry	7.75	2.12

In *The Lancet* for April 13, 1901, some interesting Russian statistics are quoted which show a startlingly high infantile death-rate in

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certain districts, attributed to irregular and unsuitable feeding of children in the peasant families. The Russian birth-rate is high, from 37 to 46 per 1000; but 268 out of every 1000 die in the first year of life. In the north-eastern half of the country for the four years 1893–96 there died 3,242,065 children out of 10,037,287 born, and in certain districts half the children born never survive their first year, the rate rising in some years to 626 per 1000. The same issue of *The Lancet* contains the preliminary results of the third general census of India, taken on the night of March 1st, and published with remarkable celerity, in a fortnight. The census shows a population of 294,266,702, an increase of 2.42 per cent over the census of 1891. Deducting tracts not included ten years ago the increase is only 1.49 per cent as against 11.2 per cent in the previous decade. The population of British India has increased 4.44 per cent, but that of the native states has fallen 4.34 per cent. These unfavorable results are due to the successive famines and the plague which has ravaged the unhappy country.

A paper "On the Correlation between Duration of Life and the Number of Offspring," by Miss M. Beeton, G. N. Yule, and Karl Pearson, published in the *Journal of the Institute of Actuaries*, for January, 1901, is as satisfactory a piece of work as are most publications by Professor Pearson. The purpose of this study is to determine whether there is any relation between longevity and fecundity which would permit the action of natural selection in human society in spite of the fact that the elimination of the unfit often takes place only after the period at which the species is mainly propagated. Statistics were obtained for four different series, including the ages at death and the number of children of (1) the women of the Whitney family, of American Quakers, (2) English women belonging to the Society of Friends, (3) American men of the Whitney family, and (4) men belonging to the class of English landed gentry. When the ages at death and the mean size of families were plotted the four series were found to be in substantial agreement. In each case the size of the family increased with the age at death, but more rapidly before fifty years than after. The points fall pretty closely along two straight lines, one for the period from twenty years to fifty, and the other running from fifty years to ninety; but the entire curve

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coincides even more satisfactory with a cubical parabola. It appears then that fecundity and longevity are correlated even after the age of fertility has passed. The American population shows a shorter average life (the women particularly having a very excessive maximum frequency of deaths between 35 and 40), a smaller fertility, and a closer connection between age at death and size of family. The most significant feature of the investigation is the tendency it discloses toward the evolution of a longer-lived race. In the four groups considered the longer-lived moiety of the parents produced 64.0, 55.2, 61.1, and 53.5 per cent of the children, respectively. Such a selective action as this would materially increase the longevity of the race and might account for a large part of that increased expectation of life which we are accustomed to attribute to improvements in sanitation.

A paper on "The Comparative Pathology of the Jews," by Dr. Maurice Fishberg, published in the New York *Medical Journal* for March 30 and April 6, 1901, is an excellent compilation of the statistics of this subject, although it contains no original material. Racial mortality rates from Prussia, Austria-Hungary, Roumania, Holland, Algiers, England, and other states are cited to show the generally lower death-rate of the Jewish people. Dr. Billings' report on the vital statistics of the city of New York for the six years prior to 1890 is quoted at some length, showing a death-rate at ages of 23.48 among persons born of American mothers, and of 14.85 among persons born of Russian and Polish mothers. The author then discusses the notably low death-rate among Jews from the infectious diseases. Relative immunity from small-pox has been attributed to more general vaccination; and freedom from tuberculosis to the sanitary control of food supplies. These causes cannot, however, contribute to the low death-rate from cholera; or to the immunity from the Black Plague which caused the Jews to be persecuted as accomplices of the devil in the middle ages. Alcoholism and syphilis are rare among the Jews, and this has been attributed to greater chastity. The abundance of gonorrhea, however, seems to throw doubt on this reasoning. Finally, diabetes and nervous disorders are shown to be very excessive among the Jewish people, the proportion of insanity being about double that observed in adjacent Christian

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populations. Dr. Fishberg's discussion of the causes of the observed phenomena seems to the reviewer a very satisfactory and thoughtful one. He points out that most of the factors suggested to explain the longevity of the Jews, such as prosperous living, rich food, sanitary regulations, strong family feeling, and good morals are insufficient to produce the observed results; and he concludes that the natural immunity of the Jew is simply the product of an unusually severe process of natural selection continued for many generations in the process of which the weak, sickly and infirm have been "eliminated from the race either by death or baptism."

The monograph on "The Past and Present Condition of Public Hygiene and State Medicine in the United States," prepared by Dr. S. W. Abbott for the United States Social Economy Exhibit at the Paris Exposition, contains a large amount of valuable material relating to sanitary practice. In the main body of the report tables and maps are given which show the extension of water-supply and sewerage systems, and the proportion of registered physicians in the various States, the annual per capita expenditure of State Boards of Health (ranging from $0.0001 in Nebraska to $0.0866 in Florida), and the extent of overcrowding in the larger cities. Dr. Abbott gives the following list of States which have maintained a fairly complete system of collection and publication of vital statistics for several years with the date of their beginning: Massachusetts, 1842; Connecticut, 1848; Rhode Island, 1853; Vermont, 1857; New Jersey, 1878; New Hampshire, 1880; Delaware, 1881; Maine, 1892; New York, 1893; and Michigan, 1897. Statistics of the infectious diseases were obtained from 6 States and 19 cities, of which the following table is a summary. Such fatality rates are, of course, always too high, but the subject is one of great interest.

Diseases.	Reported Cases.	Registered Deaths.	Fatality (per cent).
Small-pox	9,222	2,385	25.8
Typhoid fever	69,758	13,284	19.0
Diphtheria and croup	195,783	44,411	22.7
Scarlet fever	117,847	9,211	7.2
Measles	217,755	6,424	2.8

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In the appendices to the *Monograph* are tables of municipal statistics which are of great value, although some of them are not wholly reliable. The general death-rates for 1898, of 6.29 in Omaha, 8.51 in St. Paul, and 8.62 in Minneapolis, for example, are incredible. The percentage of consumption to the total mortality is over 10 in all but 7 of the 32 cities considered, and is over 13 in 6 of them. The range of cholera infantum is remarkably wide, from .7 per cent of the total mortality in San Francisco to 11.8 per cent in Milwaukee. Cancer varies from 1 to 5 per cent of the total, being generally about 3 per cent. A table of the typhoid fever death-rate for nine years in the cities with a population of over 50,000 shows New York and Brooklyn at one end of the list with rates between 15 and 22 per 100,000 population, and Albany, Jersey City, Pittsburgh, and Washington at the other end, ranging from a minimum of 50 to a maximum of 89 in Washington, and of over 100 in the other three cases. It is needless to say that all these last cities have polluted water supplies.

The *Second Annual Report of the Massachusetts State Board of Insanity for 1900* contains interesting statistical material. The table showing the annual increase of the insane for the last ten years is of special interest. Comparing the number of persons cared for in institutions and in private families under the charge of the State board and the overseers of the poor, it appears that the average daily increase has risen from 233.26 in 1890–95 to 330.47 in 1895–1900. The rise is mainly due to that class of patients treated in the State institutions which showed a daily average increase of 187.47 in the former, and of 342.32 in the latter period. The daily increase in the city and town hospitals and almshouses is much less in the second period than in the first; while the patients cared for in families and in private institutions shows an actual decrease. In considering the figures for the grand total, the Commissioners note that it is erroneous to conclude from an increase in the population of institutions for the insane that an actual increase has taken place in the amount of insanity in the community. They point out that an increase in the number of registered insane may be due merely to an improvement in "the accuracy and completeness of records, the adequacy of of public provision, the degree of public confidence in special institu-

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tions for such, the potency of influences outside the family compelling commitment, and the method and strictness of classification of the insane." The influence of growing confidence in public institutions is shown clearly by the disproportionate increase in the number of the senile and the feeble-minded, classes of persons whose commitment is not forced by necessity but is a sign of readiness to entrust dependents to the public care. While the mean population of the State increased only 42.42 per cent between 1880 and 1900, and the total commitments of the insane only 86.63 per cent, the commitments to insane hospitals of persons over 70 years of age increased 156.81 per cent, and the commitments of the feeble-minded to insane hospitals increased 381.33. The greater frequency with which insanity is now recognized is shown by the large increase in the transfers from pauper and criminal institutions to those designed for the insane. Thus at the Tewksbury State Hospital the average annual number of such transfers was 26.6 from 1891–96; it rose to 84.25 in the period since 1896. The average annual number of commitments to the Asylum for Insane Criminals has risen from 27.6 before 1899 to 41 in 1899 and 62 in 1900, while the whole number of criminals in the State has decreased.

The *Fifteenth Annual Report of the State Board of Health and Vital Statistics of the Commonwealth of Pennsylvania* contains abstracts of the annual reports of the various cities and boroughs for the year 1898 which illustrate forcibly the disadvantages of a lack of uniformity in the registration of statistics. Allentown, New Brighton, Pittsburg, and Reading record deaths by causes and ages of decedents, but not by months; Altoona, Erie, Hazelton, Lancaster, Latrobe, McKeesport, and Shenandoah report the months of death, but not the ages of decedents; other large cities cities report neither. A uniform schedule by which the data for the different cities could be compared, and from which the rates for the entire State could be calculated, would immensely increase the value of this report. Besides the four cities mentioned above only Philadelphia gives statistics of infantile mortality, a subject which is probably of more practical importance than any other except the general birth and death-rate. The following table is an eloquent arraignment of a crime against American civilization: —

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DEATHS FROM TYPHOID FEVER IN THE CITY OF PHILADELPHIA.

Year.	Deaths.	Rate per 100,000.	Year.	Deaths.	Rate per 100,000.
1889.....	736	70.7	1894.....	370	32.4
1890.....	666	63.6	1895...	469	40.2
1891	683	64.0	1896.....	402	33.81
1892	440	40.2	1897.....	401	33.02
1893...	456	40.8	1897.....	639	45.61

The only general summary, given in this report, which includes the whole State is a table of births and deaths and morbidity and fatality of infectious diseases. The totals under this last head are of interest as showing the difficulty of securing the reporting of tuberculosis. The number of cases of diphtheria must also be too low: —

STATE OF PENNSYLVANIA, 1898.

	Diphtheria and Croup.	Small-pox.	Scarlet Fever.	Typhoid Fever.	Consumption.	Measles.
Cases	7,963	56	4,525	11,845	255	3,827
Deaths...	1,819	..	235	1,422	4,008	146

No. 13 of Vol. XVI of the *Public Health Reports of the U.S. Marine Hospital Service* contains a review of the health of the city of Rio de Janeiro for 1900 which illustrates the difficulties in the way of the statistician. The population of the city at the end of 1900 as estimated by the sanitary authorities was 793,000; while a census taken December 31st showed only 431,716, the census being perhaps not much more accurate than the estimate. The general death-rate of 17.9 per 1000 calculated on the larger population is probably much too small. The ratios of deaths from certain causes to the total mortality are of interest. Tuberculosis is of prime importance with 19.5 per cent of total deaths; malarial and pernicious fever cause 7.3 per cent; diseases of the heart and arteries are credited with 11.9 per cent; cancer and pneumonia cause only 1.4 per cent and 1.3 per cent of the total deaths, respectively.

The *Twenty-third Annual Report of the Board of Health of the City of Lowell* includes considerable statistical material. The year

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1900 shows an encouraging improvement in sanitary conditions; a decrease of the general death-rate from 20.50, the lowest previous rate, in 1899, to 19.47; a decrease in the per cent of deaths under 5 years of age, to the total deaths, from 41.8 to 37.1, and a decrease in deaths from cholera infantum and diarrhœal diseases, and from diphtheria. Certain of the tables, especially a table of deaths classified by groups of diseases, might well have been omitted and replaced by fuller statistics of fatality rates and monthly incidence of the infectious diseases.

The *Annual Report of the Board of Health of Cambridge, Mass.*, for 1900, contains very full statistics with regard to the principal zymotic diseases, including mortality, morbidity, and fatality rates for ten years. The averages for the whole period, 1891–1900, are as follows: —

	Mortality per 1,000 Population.	Morbidity per 1,000 Population.	Fatality per 100 Cases.
Scarlet fever	0.31	4.37	5.66
Diphtheria	0.66	4.07	20.50
Typhoid fever	0.21	1.37	15.70
Measles	0.24	*2.98	*1.27

* 1895 1900.

It has been suggested that the note on the *Bertillon Classification of the Causes of Death* in the December number of this journal might be interpreted as an attack upon the whole movement toward uniformity. The author of the note wishes to disclaim any intention of taking such a position. A uniform system for the nomenclature of diseases is an essential for the progress of vital statistics and the devoted labors of those who have worked for its adoption deserves the greatest praise. The classification of M. Bertillon need not, however, be adopted along with his schedule of the individual diseases, and the most distinguished advocate of the Bertillon nomenclature in this country has suggested in correspondence that the use of the nomenclature need not imply that of the classification as well. It is the irrational and unscientific classification by affected organs alone against which the writer protested; and in his opinion the abandonment of this classification, or the substitution for it of an etiological one, would most effectually promote the acceptance of the Bertillon nomenclature and the progress of uniformity.

C.-E. A. Winslow.

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STATISTICS OF BERLIN.

Statistisches Jahrbuch der Stadt Berlin; Funf undzwanzigster Jahrgang, 1898. Nebst Ergänzungen für frühere Jahre. R. Böckh, Direktor des Statistischen Amts. Berlin, 1900.

This magnificent work of Professor Böckh surpasses each of the previous volumes in the wealth of material which the author presents. It is unlike many of the statistical year-books of other cities, in the presentation of the very full comments which are introduced by the author and his assistants upon the various tables which are here compiled, having reference to the statistics of Berlin for the year 1898 and previous years. The first portion relates to the numbering of the population which had increased from 283,140 in December, 1837, to 1,843,582 in December, 1899.

The following 150 pages treat of the vital statistics of the city, and in these pages are presented all the essential facts relating to the population of Berlin for the single year 1898 and for many previous years. This portion of the work presents the facts relating to the mortality from the principal diseases in a very large city for a series of years in such a manner that the facts relating to each disease may be readily studied and compared with other diseases. The mortality from cancer, for example, had increased from 657 per million among men in 1876, to 1537 per million in 1895, and among women from 1126 per million in 1876, to 1775 in 1895, while consumption had diminished in the same period from 4295 per million to 3351 among men, and from 2625 to 1951 among women.

The well-known figures of Dr. Böckh relating to the effect of the food of infants under one year upon their mortality are presented for the year 1898 in detail, together with ten-year tables giving the causes of death of such infants. These are also classified as legitimate or illegitimate infants, the former dying at the rate of 166.5 per 1000 and the latter at 355.3 per 1000. The table of causes of death follows with some modification the system of Virchow, in which prominence is given to separate diseases rather than to general groupings, the whole number of titles being 138. The most prominent causes of death were: Infantile debility, 2202 deaths; consumption, 3553; pneumonia, 2389; cancer, 1606; heart disease, 1549; apoplexy, 1008; diarrhœal diseases, 3828.

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The second chapter comprises the weather statistics of the city for the year 1898 and for a series of years. The table for the single year 1898 also presents the deaths in each week. In the middle week of August, with a mean temperature of 21.5° C. or 71° F., the deaths were 880, of which 505 were those of children under one year, as compared with weekly means for the year of 587 for all deaths and 197 for children under one. The mean annual temperature of Berlin for 50 years was 9° C. or 48.2° F. The mean barometric pressure reduced to a normal standard for 50 years (1848-97) was 761.57 mm., or 29.99 inches. The rainfall for the year 1898 was 514.8 mm. = 20¼ inches. The mean annual rainfall for the 50 years 1848–97 was 569.1 mm. or 22.4 inches. Other topics treated in succeeding chapters are the statistics of the care of streets (cleaning, lighting, sprinkling, repairs, etc.), sewerage, water supply, fire extinction, trade products, breweries, horses and cattle, agricultural products, banking, prices, consumption and traffic in goods of all kinds; shipping, postoffice, telephones and telegraphs.

Under the head of fire losses, it appears that there were 9160 fires in the year ending March 31, 1899, as compared with 8440 in the previous year. Fires are classified as great, small, medium, and chimney fires, still alarms, malicious alarms, and fires outside the city. Causes relating to fires in the better class of houses are also divided into 24 groups, of which carelessness accounted for the larger number specified; incendiary fires 42 out of 1758, defective flues 66, burning soot 72. Under the title of life and accident insurance, it appears that the number of deaths of insured persons in 1898 was 1143, of which number 741 were men and 402 were women. The principal causes of death in these cases were: Cancer, 154; consumption, 128; apoplexy, 127; heart diseases, 170. Under the title of industrial insurance the principal trades are represented by 40,316 workmen in iron and steel, 22,474 telegraph and telephone workmen, and 59,965 mechanics. The principal causes of ill-health among those insured for invalid insurance were: Consumption, 24.6 per cent of the men who were sick and 15.7 per cent of the women; other lung diseases, 11 per cent of men and 6.9 per cent of women; exhaustion, anemia and old age, 6.7 per cent of men and 16.8 per cent of women; rheumatism, 7 per cent of men and 11.6 per cent of the women; heart disease, 6.2 per cent of the men and 5.1 per cent

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of the women. Many other interesting tables are presented in which statistics are given of the occupations of the insured and the diseases for which they were invalided, their ages, sexes, and in one table the diseases and principal occupations combined.

Chapter 8 treats of charitable and benevolent institutions and the care of the sick. Berlin does not appear to have adopted the English plan of separate isolation hospitals for infectious diseases. Other chapters treat of police, prisons and criminal matters, educational establishments, churches and religious organizations, and, lastly, of the city taxes, income and expenditures.

S. W. A.

GOVERNMENT ANNUALS AND PERIODICALS.

Tables of Public Documents printed annually or at regular intervals as provided by law, showing the extra and usual number printed and the distribution of the same. Prepared by the Superintendent of Documents. Washington, 1901. 12 pp. 8vo.

Anyone who frequently uses Government publications will desire to possess a copy of this pamphlet, both that he may know what publications are regularly issued and that he may be able to find at a glance where to apply for those he has need of. The principal list includes sixty-five entries of Government annual or periodical issues, the printing of which is provided for by law, excepting the Official Register of the civil, military, and naval service of the United States, or "Blue-book," the Congressional Record, the editions of the Statutes and Session Laws, maps, and the publications of the Patent Office, which are treated in separate paragraphs. The letter "To Librarians" accompanying the pamphlet claims only that it "contains a list of substantially all the Government periodicals, . . ." and as the introductory note indicates, it does not attempt to include documents printed only upon requisition of the heads of Executive Departments or other offices. It is to be regretted that the entries in the principal list are unsystematically arranged, as the whole list must now be examined to find the particular item desired.

L. P. Lane.

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CONTENTS.

THE STATISTICAL WORK OF SÜSSMILCH. *By Frederick S. Crum, Ph.D.* 335

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AMERICAN

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NEW SERIES, No. 55. SEPTEMBER, 1901.

THE STATISTICAL WORK OF SÜSSMILCH.

By Frederick S. Crum, Ph.D.

The subject here presented was chosen for a doctor's dissertation while the writer was pursuing studies in statistics, economics, and sociology in Cornell University. The discovery was made that a copy of one of the first imprints of Süssmilch's *Die Göttliche Ordnung*, dated 1742, and an exceedingly rare book, was available in the library of the Surgeon-General in Washington, D. C. Through the courtesy of the librarian of the Surgeon-General's library the copy was loaned to the University for a limited period, and the writer's interest thus aroused induced him to choose for the subject of his thesis *The Statistical Work of Süssmilch.*

The bibliography of the writings of Süssmilch, which forms Part iv of the following essay, was published as a trial bibliography in *The Quarterly Publications of the American Statistical Association*, September, 1897, under the joint authorship of Professor Walter F. Willcox and the present writer. Acknowledgment is here gratefully made of the assistance rendered by Professor Willcox in the compilation of the bibliography, and for many helpful suggestions and kindly criticisms throughout the preparation of the following paper. Thanks are also due to the librarians of the principal libraries of Europe and America for their prompt and willing assistance in the work of making the bibliography as complete and accurate as

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possible, and particularly to Professor v. John of Innsbruck, and Professor R. Boeckh of Berlin, who were able to add several titles to those we had compiled, and to correct some that were included in our original list.

If any apology is needed for the following somewhat extended discussion of Süssmilch, it is found in the fact that he occupies a unique place in the historical development of population statistics, and heretofore there has been no presentation, in English, of his work and ideas at all adequate to meet the requirements of American and English students of the subject.

I. Biographical Sketch.[1]

The Süssmilch family can be traced back to northeastern Bohemia, where it received from Maximilian I, in 1513, the hereditary judgeship of the Lusatian stronghold of Tollenstein, situated about three miles from Zittau. Christof Süssmilch held this office of judge from 1600 to 1634, and his second son, Elias, the great-grandfather of Johann Peter Süssmilch, succeeded him. This Elias had been led to embrace the Protestant faith, but his second wife persuaded him to turn again to the Roman Church. By his first marriage he had one son, also named Elias, the grandfather of Johann Peter. This son did not favor his father's change of belief and himself remained a Protestant. As a result of his religious convictions he was exposed in 1650 to the persecutions which the Bohemian Protestants suffered at the hands of the Emperor Ferdinand III, and in addition was subjected to harassments by the relatives of his step-mother. It is chronicled that young Elias preferred the safety of his

[1] No good biography of Süssmilch exists. John, who has written a short sketch of Süssmilch's life in the *Deutsche Biographie*, there mentions the only sources from which he was able to get his facts. These were three in number: Christian Förster's biography, 1768; a biography in the 18th part of *Neuen Gelehrten Europa;* and a short biographical sketch in Formey's *Histoire de l'Académie Royale des Sciences et Belles-lettres*, 1767. John considers Förster's account to be the most complete and satisfactory. John's article in vol. xxxvii of the *Deutsche Biographie*, and Formey's sketch are the sources relied upon for the facts here presented.

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soul to the perservation of his temporal goods, and fled from his native country. Having exhausted his means, he engaged in military service under the Great Elector, Frederick William, in Brandenburg. His ability soon won him promotion to the office of Lieutenant-Master of the Watch, and he enjoyed the special favor of the Elector. After the battle of Fehrbellin, this old Protestant warrior retired to his estate at Zehlendorff, situated halfway between Berlin and Potsdam.

The eldest son of this military favorite was Johann Peter's father, John Elias. In his youth he had visited France, England, and Holland, and had seen most parts of his own country. On one of his journeys he visited the old family estate in Bohemia. He at that time was offered the property and office his father had abandoned if he would embrace the Catholic religion, but he refused to be bribed into apostacy. He married Marie Blell, daughter of Peter Blell, master dyer at Brandenburg, and established himself in Berlin as a grain dealer and proprietor of a brewery.

Johann Peter Süssmilch was the eldest son of these well-to-do, sturdy and honest Brandenburgers. He was born in Berlin in 1707. His parents resolved to spare no expense in procuring him an excellent education, and we gather from his biographers that young Süssmilch heartily responded to his parents' desire and eagerly embraced the exceptional advantages placed within his reach.

His early youth was spent in the village of Brandenburg, with his grandparents, the Blells. In 1716 he entered the college of Berlin, where he remained six years. At this institution he seems to have shown a strong liking for natural history. Frisch, his instructor in natural history, to better acquaint his students with the elements of the natural sciences, took his classes on short excursions to the neighboring fields and woods. We are told that on these expeditions young Süssmilch excelled all his fellows in the zeal

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with which he collected stones, shells, insects, and botanical specimens. At this early age was apparently evinced that natural bent which was later to serve him so well in the collection of statistical data.

In 1724 Süssmilch attended the Anatomical Institute in Berlin, which had just been organized. At this time he was ambitious to become a physician, but in deference to his parents' wishes he left Berlin to pursue the study of law in a Latin school at Halle. Law proved distasteful, and in the meantime he had become interested in theology, and he finally persuaded his parents to consent to a substitution of theology for law.

Like many other young men, Süssmilch seems to have experienced much difficulty in making choice of a profession. Theology, however, proved agreeable to his tastes, and having definitely decided to make this profession his life work he devoted himself to it with his characteristic energy. In 1727 he was in attendance at Friedrichs-Universität, Halle, where he pursued the study of Hebrew and the related oriental languages with a zeal that endangered his health. In 1728 he went to Jena where he remained two and a half years studying theology and philosophy under the most famous teachers of the time. It was while a student at Jena that he acquired a taste for academic life, and even aspired to become the occupant of some university chair. His parents, however, would not listen to such a proposal, and his college career closed when, in 1733, he defended his thesis, *Dissertatio de cohaesione et attractione corporum*, written at Jena under the direction of Hamberger.

Before he had completed his thesis young Süssmilch had been asked to accept the position of private tutor to the eldest son of Marshal Kalckstein. The offer was accepted and, as private tutor, he remained with Kalckstein four years when, in 1736, he was made chaplin of the Kalckstein regiment.

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In 1738 Süssmilch preached in the King's cabinet, and several times subsequently the same honor was accorded him. In 1740 he was offered the curacy of Ezien, but at about that time the First Silesian War broke out and he considered it his duty to march with the Kalckstein regiment. It was during this campaign that he wrote the preface to the first edition of *Die Göttliche Ordnung.* The campaign ended, the young chaplin resumed his ministerial functions, preaching first at Ezien and later in the church of St. Peter in Berlin.

In Berlin Süssmilch soon acquired an enviable reputation as a preacher and scholar. In 1745 he was admitted to membership in the Berlin Academy, and five years later another honor was paid him in his election to membership in the newly organized Supreme Consistory.

The masterpiece of his literary efforts was *Die Göttliche Ordnung.* The spare moments of his life were spent in writing, revising, extending, and defending this statistical work, the subject matter of which is sufficient evidence of the indefatigable industry of its author,

Süssmilch married at the age of thirty Charlotte Dorothy Lieberkuhn. We are assured by his biographers that his home life was exceptionally felicitous, and that he was never so happy as when in his library, surrounded by the books which he had collected at great expense. He was blessed with ten children, nine of whom with his wife survived him. He died from an attack of apoplexy, March 22, 1767, at the age of sixty.

With this brief sketch of the life of Süssmilch we pass to a consideration of the contents of his principal literary work, *Die Göttliche Ordnung.*[1]

[1] For an extended discussion of the bibliography of Süssmilch, the birth of his idea to write *Die Göttliche Ordnung,* and the various editions through which it passed, see Part iv.

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II. Süssmilch's Theory of Population as Developed in "Die Göttliche Ordnung."[1]

Like the Mercantilists, Süssmilch was firmly convinced that the power, prosperity, and happiness of a state or nation largely depends upon the number of its inhabitants and upon the rapidity of their increase. Starting with this assumption, he repeatedly emphasizes it.

The Creator intended that man should multiply and fill the earth, and to this end uttered the command: "Be fruitful and multiply, and replenish the earth, and subdue it." That this command may be fulfilled, certain conditions are necessary. The number of births must, on the average, exceed that of deaths. There must be some conformity to law, or a regularity in diseases. They must be so proportioned and distributed as to bring about a proper average duration of life. It is necessary also that there be a regularity in the propagation of the two sexes.[2]

Süssmilch sets out to demonstrate, with more thoroughness than any of his predecessors had done, that the phenomena of birth, marriage, disease, and death are bound together in a most perfect, complete, and beautiful system. The perfection of this system (*Ordnung*) is the result of divine interference and control, otherwise it might be overturned at any moment. The striking regularities in these vital phenomena, the manifestations of which, to the casual observer, are apparently so fortuitous, furnish a strong foundation for belief in a God, who with concealed hand, binds together the various rules of this whole system in a beautiful and durable union for the attainment of His great design — that men shall constantly increase upon the earth.[3] As regards the generation, duration, and preservation of our lives, God is an infinite and exact arithmetician.[4]

[1] References, unless otherwise stated, are to the second edition (Berlin, 1761-62) of *Die Göttliche Ordnung.*

[2] Vol. i. Introduction.

[3] Vol. i, sect. 16.

[4] Vol. i, sect. 17.

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The very title of the book, *Die Göttliche Ordnung*, reflects with sufficient clearness the notion that the conformities to law in social life find their explanation in divine supervision.

In commenting upon the utility of his work,[1] Süssmilch observes that the chief benefit to be derived from its study is the knowledge which it affords of the divine oversight of the changes to which the inhabitants of the earth are subject. "Everything is arranged according to definite numbers and proportions. Men are born and men die, but always in a certain ratio. Children are born, sons and daughters promiscuously, but without violation of the order once chosen by Providence. Men die, at first sight, irregularly as regards age, but, upon more exact observation, in accordance with fixed proportions. Now, as man contributes little or nothing to all this, and more accidental events are chimeras worthy of derision, we are strengthened in the truth that God cares for the human race."

Throughout this discussion Süssmilch is dominated by theological and teleological conceptions. The final cause of the wonderful conformities to law in the movements of population is God; the ultimate purpose in view is the increase of mankind.

Süssmilch's ideas respecting the dynamic changes in population may conveniently be grouped under three heads: (1) The increase of the human race; (2) marriage and fecundity; and (3) mortality.

1. The Increase of the Human Race.—Süssmilch estimated that, with liberal allowances, the population of the earth could not be over 1080 millions, while it might easily support at least 5000 millions. He therefore emphatically denies that war, pestilence, or famine are necessary to maintain an equilibrium between population and subsistence.[2] The actual population of the world being far short of the possible popu-

[1] Preface to the first edition of *Die Göttliche Ordnung*.
[2] Vol. ii, pp. 177, 232. Also vol. i, sect. 204.

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lation, an increase of mankind is the normal and proper condition of things.[1]

The proportion of births to deaths is dependent upon laws of mortality and fecundity, the limits of which are so fixed by the Creator that an excess of births over deaths everywhere prevails when whole provinces are taken into account and the period observed is normal.[2] In cities, owing to peculiar conditions, not infrequently deaths exceed births. When, however, the observation is of an entire province or country the deaths cannot exceed the births, except during an epidemic period, or unless the country is exceptionally full of people and the opportunities for the maintenance of new families are all taken. Regarding Prussia, Sweden, and England as fairly typical countries, Süssmilch concludes, from data gathered in those countries, that the average ratio of births to deaths for an entire country is 13 to 10, or at least 11 to 10. As a natural corollary he declares that the population is not stationary but increasing, an opinion by no means universally held at that time.[3]

From the data at his command Süssmilch considered the general average period required for a population to double in numbers to about 100 years.[4] He recognizes, however, that the rate largely depends upon the conditions of time and place.

Had it not been for the devastations wrought by pestilence, war, famine, and other plagues, the world would long since

[1] It is interesting to note the method employed by Süssmilch to determine the number of people whom the earth might support. He estimated that an English square mile could, under proper tillage, support at least 200 inhabitants. On this assumption Europe might support 550 millions of people, whereas, from the best information available, he concluded that it contained only about 130 millions. The estimates of the actual population of the various countries of Europe and of the world were necessarily quite arbitrary, owing to the fact that enumerations of populations even in small districts were seldom made. It was therefore necessary in any attempt to obtain the population of a country to have to resort to various indirect methods. So far as we know, Süssmilch's calculations of the population of the earth were fairly good, and compare favorably with other estimates made in the 18th century.

[2] Vol. 1, sect. 120. [3] Vol. i, sect. 140. [4] Vol. i, sects. 140–146.

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have been fully populated.[1] Of all the obstacles to increase, the pest is undoubtedly the most detrimental. Its ravages vary greatly. Sometimes one-twelfth; sometimes one-third or one-half the population of a district are struck down by it.[2] The mortality from the pest can be considerably modified, and the danger of its visitation lessened by proper health regulations. It is a greater menace to mankind than war, because it not only blights the tree in the twigs and branches, but also in its very roots. It not only destroys adults and breaks up marriages; it smites also children and babes.[3]

Süssmilch denounces war as a monster, and a stain upon reason, humanity, and christendom. It robs the state of many of its best men. Marriages are broken up by the premature death of husbands, whose widows for the most part fail to re-marry. As the two sexes are approximately equal at the marriageable age, war, by destroying large numbers of the young men, leaves many maidens unwed. Means of subsistence are rendered more difficult to obtain by the damage inflicted by war upon manufactures and commerce. Finally, war fosters pestilence and famine, two powerful checks on the increase of mankind.[4]

Famine is the most terrible of all afflictions, but, fortunately, its visitations are infrequent. It is much to be dreaded, however, and governments should see to it that proper storehouses of food are provided against emergencies.[5] The destruction of population by floods and earthquakes is slight in comparison with the mortality caused by the other enemies of mankind.[6]

Polygamy has given rise to eunuchism, a wide-spread custom detrimental to population.[7] What eunuchism is to the East celibacy is to the West.[8] Celibacy is to be unsparingly condemned, because it checks the increase of population, and

[1] Vol. ii, sect. 168.
[2] Vol. i, sect. 180.
[3] Vol. i, sect. 182.
[4] Vol. i, sects. 183–188.
[5] Vol. i, sects. 189–191.
[6] Vol. i, sect. 192.
[7] Vol. i, sects. 193–196.
[8] Vol. ii, sects. 197–203.

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corrupts the morals. The Catholic church and standing armies are the causes of this great hindrance to the growth of population.

Süssmilch was a firm believer in govermental interference if in any way it would promote the increase of the population. The three primary aims of the state, he maintains, are the happiness, security, and wealth of its members. Population is the foundation of all three.[1] A ruler should learn to value his subjects. He should be interested in them not merely because they are his fellow citizens, but also because they are the tools with which the general happiness, power, safety, and wealth of the state are secured.[2] Rulers should therefore employ all possible means to promote population, and to remove all obstacles to its increase.

The pleasures of a people are enhanced by their being in close relation with each other. This is the reason that life in the city is preferred to life in the country.[3] The exchange of products, and the satisfaction of the varied needs, can be more easily accomplished when the population is compact. The more men there are in a state, who by their industry not only create the most indispensable necessities of life but also an excess, so much the more readily can the state grow in wealth and power by the exchange of the surplus for the precious metals.[4]

No obstructions should be placed in the way of marriage. When the proportion of inhabitants to the annual number of marriages rises, it is a sign that marriage is restricted. It is the duty of a ruler to oppose celibacy and to encourage matrimony.

Agriculture, the mainstay of a country, should be carefully fostered.[5] Manufactures, trade, and the arts have their great value, but they must not be exalted above agriculture. If a country is to contain the largest possible number of

[1] Vol. i, sect. 205.
[2] Vol. i, sect. 209.
[3] Vol. i, sect. 206.
[4] Vol. i, sect. 208.
[5] Vol. ii, chap. xv, and vol. i, sect. 221.

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inhabitants no land can lie unused. The holdings must be allotted in such manner that the peasant shall have neither too much nor too little. The imperial domains and other large estates should be let to the peasants for a quit rent in produce. Economy, too, on the part of the peasants is of great importance. The land should be cultivated by oxen rather than by horses. Grain will thus be saved, and the old ox can be consumed for food. Every peasant must possess his own separate property if agriculture is to flourish, for he will labor more willingly when he knows that he is pursuing his own interest. Court and other compulsory services which are burdensome to the peasant should be abolished. The planting of fruit trees, and the keeping and culture of bees should be encouraged. Finally, Süssmilch advocates the establishment of a college of agriculture to have general oversight of agriculture, propose needed improvements, and compel the execution of them.

Manufactures, if properly conducted, promote marriage, keep money in the country, and increase the state revenue.[1] Unless agriculture is fully developed, however, there is danger of attempting too many manufactures. Governmental supervision is necessary to preserve the proper balance between the two.

It is fortunate for the state to have large exportations, as it is then in a position to grow ever richer in men and money. When, therefore, foreign markets have once been established strong efforts should be made to hold them by maintaining the good quality of the exports, and by keeping the prices reasonably low. Manufactures, particularly of textiles, should not be unduly encouraged in large cities where the cost of food is higher than in the country. Bounties upon newly established industries, or upon exports, may also be of advantage.

2. Marriage and Fecundity. — Marriage is the union of a man with one or more women for the purpose of propagating,

[1] Vol. ii, chap. xvi.

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preserving, and rearing children. Marriage is the best means for populating the earth — best for the parents, for the children, and for the state. It affords husband and wife their best society. They mutually minister to each other's wants, lighten each other's burdens, and sweeten the adversities of life. Through the marriage relation the general welfare is best promoted, the needs of nature are best satisfied, and the offspring are best cared for. Children require longer nursing and care than the young of the lower animals. Mother and child require the protection of the father longer. For these reasons the marriage relation is the strongest bond of the state.[1] Marriages, too, form the basis of fecundity and the increase of mankind, and they must be sufficiently numerous to bring about an excess of births over deaths.

Fecundity may be distinguished as general and special. The general fécundity is the ratio of the annual births to the total population; the special, marital fecundity is the ratio of the legitimate births to the marriages.[2]

If the natural impulses of man could have free play the proportion of marriages to the total population would always be about the same. Such a state of things exists, however, only in countries or regions comparatively unpopulated. When a country is tolerably well filled with inhabitants checks to marriage arise, owing to the wise foresight of men. He who resolves upon marriage assumes at the same time duties which bind him to the maintenance of a family. If the opportunities of providing such maintenance are lacking, his desire to marry is restrained. The more difficult the acquisition of a maintenance the more obstacles are thrown in the way of matrimony, and the fewer the number of marriages contracted. If to these difficulties be added external compulsion, whereby men are restrained from mar-

[1] Vol. i, sect. 53.
[2] Vol. i, sect. 54.

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riage by laws and force, then the number of persons engaging in matrimony will be still smaller. It is circumstances of this sort that cause different marriage rates in various countries and districts.[1]

From data gathered in 1056 villages of Brandenburg, Süssmilch found the average ratio of marriages to population to be 1 : 108. This ratio, he adds, will remain about constant so long as the old system of rural economy remains unaltered. He held Brandenburg to be so fully populated that, unless improvements were made in the methods of agriculture, marriages could not be contracted until opportunities were afforded by death.[2] The notes of Wargentin for England and Sweden, the accurate observations of Struyck for twenty-two villages in Holland, and the tables of Short for certain English villages, all confirmed the ratio, 1 : 108, found in Brandenburg.[3]

Examination of the data collected in Halle, Leipzig, Augsburg, Danzig, Berlin, Amsterdam, Zurich, Paris, Königsburg, and in the districts of Magdeburg, Halberstadt, Minden, Cleves, Pomerania, Brandenburg, and Prussia led Süssmilch to conclude that there had been a decline in the marriage rate since the beginning of the century, 1700, except in Prussia and Pomerania.[4]

What, he asks, is the explanation of the decline in the marriage rates of the rural districts? Are the same causes at work as in the cities, namely, a constant rise in the price of necessities, and growing extravagance in habits, which render the maintenance of a family increasingly difficult? But the peasant raises his own grain and is not extravagant and inclined to luxury like the burger. The reason for the diminishing number of marriages in the country districts must be found in the fact that the villages and market towns are, under present conditions, fully populated. Every village has its definite bounds and its definite number of farms to

[1] Vol. i, sect. 55. [2] Vol. i, sect. 56. [3] Vol. i, sect. 57–59. [4] Vol. i, sect. 72.

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which belong a certain number of day laborers and workmen. If every village has the men and families that it needs there can be no new marriages. The unmarried adult people cannot marry if they wish to do so except as death makes room. In a province fully inhabited under the prevailing economic and industrial conditions only a certain number of new marriages can be annually contracted. Only so long as there is at hand unused fields can men freely follow their natural impulses and marry when inclination moves them.[1]

Süssmilch does not overlook the fact that the conditions of civil, political, and social life set limits to our freedom and act as checks on the natural impulses. Upon the political and social organization largely depends the ease or difficulty of acquiring the means of subsistence for a family. When a young man arrives at the marriageable age the question is raised "Whence shall I secure bread for wife and children?" If the problem is difficult to solve marriages are postponed and fecundity diminished. France is pointed out as a notable example of a country the political and social organization of which is such that the increase of the population is seriously hindered. The oppression of the Farmers-General and the steady increase in the taxes levied upon agriculture act powerfully to restrain the people from marrying and to diminish the marital fecundity. If these evil conditions are not remedied the best provinces, one-half the lands of which are already uncultivated, must eventually be depopulated.[2]

Cheap means of subsistence have a great influence on marriage. If the price of necessaries rise while wages remain the same many laborers are kept from marriage.[3] In cities, so large as not to be able to get food near at hand to support their inhabitants, provisions are likely to be dear. For this and other reasons it is better that cities be numerous and small than few in number and large.[4]

Taxes may easily become a serious hindrance to marriage. From the maxim that necessity is the mother of industry and

[1] Vol. i, sect. 72. [2] Vol. i, sect. 76. [3] Vol. i, sect. 223. [4] Vol. i, sect. 224.

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useful inventions has come the opinion held by some that industry, agriculture, and trade are fostered by keeping taxes high. Beggars are not inventors. If men are to achieve the most of which they are capable they must not be taxed until they lose all hope of bettering their condition in the future.[1]

Luxury, too, is an obstacle to marriage.[2] Splendor, wantonness, and extravagance begotten by pride and accompanied by immodesty and vanity increase the cost of living and place a serious check on marriage. Luxury gives rise to a large number of servants who necessarily remain unmarried. Besides impoverishing individuals, it weakens the state by encouraging unnecessary importations. The children of parents who indulge in luxury are seldom trained in good counsel and solid thinking. A prince must deal with his subjects somewhat as parents deal with their children, limiting and regulating their expenses. Süssmilch even thought it might be useful to divide the people into classes, according to wealth, dignity, and position. Regulations could then be made by a body of censors respecting the expenditures of each class for dress, food, servants, etc.

In order that the best results may obtain, the marriage bond should be made durable. Divorces should only be granted for the weightiest reasons.[3] If divorces are granted unreservedly, intrigues, jealousies, and crimes, harmful to the morals, and opposed to the increase of population, are likely to be unlimited. The ruler should strive to place marriage on a high plane, and should discourage and restrict in every possible way polygamy, harlotry, and divorce.

In his zeal to promote the rapid increase of population, Süssmilch goes so far as to assert that it is the duty of the ruler to see to it that those who are capable of marrying and supporting a family do so. As a punishment for men who

[1] Vol. i, sect. 225.
[2] Vol. i, sect. 229; also vol. ii, chap. xvii.
[3] Vol. i, sect. 231.

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obstinately remain bachelors, their property should be confiscated and applied to a marriage fund for the assistance of the married poor.[1]

It is the duty of a ruler to make all possible provision for the preservation of the lives of his subjects, and also to make his government so attractive as to keep them in his country. Liberty and property, justice, freedom of conscience, and religious tolerance are necessary if the subjects are to be inspired with a desire to remain in their fatherland.

As the changes in population depend so largely upon the social and political organization of the people it follows that state-craft should pay special attention to these matters and endeavor exactly to determine the proportion of marriages annually contracted to the total population, and seek if by any means the proportion can be raised. The wisest, truest servants of the state are those who seek to make it yearly more populous, to clear away all obstacles to marriage, to grant men freedom, and to make possible the satisfaction, in orderly ways, and particularly through marriage, of the natural impulses implanted in them by the wisdom of the Creator. Every marriage prohibited, every child less brought into the world, weakens the future power of the state. They are bad counsellors who think to enrich princes through the increase of taxes and the enhancement of the prices of the first necessaries of life. By this short-sighted policy the foundation of the wealth of the country is destroyed for a temporary revenue. That prince acts wisely who seeks the enlargement of his income in the reasonably promoted increase of his subjects. If human wisdom and virtue are the mainsprings of government, a ruler promotes his own interests, and advances the prosperity of his state, when he acts in accordance with the divine purpose, which aims at the fecundity and increase of mankind.[2]

[1] Vol. i, sect. 233. [2] Vol. i, sect. 78.

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Taking into account an entire country, there are about four children to every marriage. Now, so far as the natural powers are concerned, the fecundity might be much greater. The bearing period of women is at least twenty-five years (15 to 40), and allowing for only one child every two years, twelve children per marriage are possible under favorable circumstances. Why is the fecundity so comparatively weak? Süssmilch distinguishes two classes of causes. First, those which lie outside human control, and secondly, those due to man's wilfulness — irregularities, and dissoluteness.[1]

In the first class of causes are the following: Often one of the wedded persons is naturally infertile. Sickly, frail, consumptive parents reduce the marital fecundity. The premature disruption of the marriage by the death of one party, particularly when the other fails to remarry, as widows generally do. The unnatural marriage of young girls to old men, and of young men to middle aged widows. Such marriages are unreasonable, sinful, highly detrimental to the increase of population, and worthy of the severest suppression.[2] Süssmilch even goes so far as to recommend a law that would forbid the marriage of young people to those past the reproductive age. Exceptions might be made in certain cases, but a good dowry should be required from the exempted couple to go toward the assistance of two or three poor people who could thus be placed in a position to make good the damage done the state by the unnatural marriage.

Late marriages also contribute to the diminished marital fecundity. These, however, are largely dependent upon the civil and political organization of society, and are not to be avoided if the country is fully peopled and the opportunities for acquiring a maintenance are all taken. Too early marriages are also opposed to a high fecundity.

In the second class of causes are the following: Debauchery among the youths. The fear and anxiety of mothers

[1] Vol. i, sect. 89. [2] Vol. i, sects. 90, 91.

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who dread the dangers of childbirth, a dread which might largely disappear if provision were made for a larger number of skilful midwives and doctors. The fear of large families, and anxiety as to the burden of maintaining them, tempts many men to remain single or, if married, to possess but few children. Finally, the fecundity is diminished by the long nursing of children by the mothers.[1]

Does any one people, country, or planet have a natural advantage above all others in respect to marital fecundity? In opposition to writers, like Machiavelli and Montesquieu, Süssmilch answers the question in the negative. Human nature he holds to be everywhere the same. Fecundity depends not upon the climate *per se*, nor upon a particular race or country. Freedom, easy maintenance, and virtue are the three essentials to a high marital fecundity.[2]

It is highly important that statesmen have a knowledge of the ratio of births to marriages. This is a state-barometer, and in it is reflected the true gains and losses in the wealth and power of the state.[3]

Süssmilch was not the discoverer of the fact that, on the average, more boys are born than girls. John Graunt, an Englishman, had observed this phenomenon as early as 1662.[4] Süssmilch, however, had as a working basis more data than his predecessor. He finds that when large numbers are observed, on the average, 104 or 105 boys are born to every 100 girls,[5] an excess somewhat smaller than that stated by Graunt. Süssmilch regards this law as fixed by the Creator for the purpose of securing the increase of mankind in the most rational way, namely, through monogamous marriage. The excess of boys over girls at birth is necessary in order that the two sexes may be approximately equal at the marriageable age since, in the early years of life, the death rate for males is higher than for females, largely owing to

[1] Vol. i, sects. 92-95.
[2] Vol. i, sect. 98.
[3] Vol. i, sect. 103.
[4] Graunt, *Bills of Mortality*, chap. viii.
[5] Vol. ii, sect. 409.

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the more severe conditions of life to which the former are exposed.[1]

The opinion generally accepted had been that the greater mortality among males was just sufficient to bring about an exact equilibrium of the two sexes at the marriageable age. Süssmilch modifies this view. He concludes that the women are slightly in excess at that age.[2] For a long time this phenomenon was a riddle to him, but at last he found an explanation of the apparent inconsistency in the fact that more widows than widowers fail to re-marry. It is more difficult for a widow to get a second husband than for a widower to find a second wife. The widows who re-marry are to the widowers who re-marry about as four to five.[3] The excess of females at the age of maturity is, therefore, serviceable as it allows widowers to practice *Polygamia successiva* and re-marry, whereas they could not or would not marry a widow with several children.[4]

Polygamy, or *Polygamia simultanea*, Süssmilch looks upon as a sin and injustice. Owing to the approximate equality of the two sexes at maturity, the possession of several wives by one man must, if the practice is at all general, deprive some of his fellows of the enjoyment of married life.[5] If the proportion of the sexes were different, polygamy might come to be the normal marriage relation. If there were twice as many women as men in the world, polygamy would not be a sin; under such circumstances, the practice of polygamy would even be a duty.[6]

3. Mortality. — In his discussion of deaths, Süssmilch attempts first to determine the average annual number as compared to the total population.[7] This ratio of the annual deaths to the total population he calls the standard (*Mass*) of mortality. That this standard may be as typical as possible, it is sought in that element of the population least removed from natural conditions; that is, in the healthy,

[1] Vol. ii, sect. 409.
[2] Vol. ii, sect. 423.
[3] Vol. ii, sect. 429.
[4] Vol. ii, sect. 430.
[5] Vol. ii, sect. 434.
[6] Vol. ii, sect. 435.
[7] Vol. i, chap. ii.

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robust, and industrial rural folk. From data gathered from 1056 villages of Brandenburg, for a six-year period (1743–48), Süssmilch finds the average ratio to be one death to every forty-two or forty-three inhabitants, these six years being exceptionally free from epidemics. The average ratio for mixed years (1739–48), including epidemic years, was 1 : 38, or 1 : 39. In twenty small cities of Brandenburg the average ratio in 1738 was 1 : 37. In large and populous cities, and in cities where a large amount of money circulates the death ratios are considerably higher, ranging on the average from 1 : 24 to 1 : 30. The final outcome of the investigation is that the mortality among the country folk in mixed years is, approximately, 1 : 40 (25 per 1000); in small cities, 1 : 32 (31 per 1000); in larger cities, like Berlin, 1 : 28 (36 per 1000); and in the largest cities, like London and Rome, 1 : 24, or 1 : 25 (40 per 1000). In whole provinces, urban and rural communities reckoned together, the average ratio of deaths to population is 1 : 35, or 1 : 36 (29 per 1000.).[1]

From this comparison of deaths and population Süssmilch draws five conclusions.[2] First, nature and the powers of nature are everywhere the same, and, therefore, the dissimilarity in the duration of life, as between different groups of population, is to be attributed to unlikeness of customs and diets. Secondly, localities separated geographically but under approximately similar conditions in other respects are comparable as regards mortality if the periods of time observed are identical. Thirdly, other circumstances equal, where the number of deaths is relatively large the population may be regarded as relatively large. If the number in one locality is twice that in another, under similar conditions, the population of the former may be considered as twice that of the later. Fourthly, the mortality of cities is not comparable with that of provinces, because the rules of mortality

[1] Vol. i, sect. 35. [2] Vol. i, sects. 38–42.

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for cities, owing to various reasons, are quite different from those applicable to whole provinces. Lastly, in mortality there is something constant and universal. All ages, sexes, and diseases must be definitely proportioned to each other to bring it about that in a province one person annually dies of every thirty-six.

The causes assigned by Süssmilch in explanation of the high mortality in cities may be classified as subjective and objective. As compared with the rural population, the morals of the city inhabitants are more corrupt, their manner of life more luxurious, and their cares and passions greater. The higher morality of city children as compared with that of children resident in village and country is largely due to their weaker constitutions, and the negligence of their nurses who seldom are their mothers. Among the objective or external causes is the denser and more impure air of the cities. Contagious diseases spread there more rapidly than in the country, owing to the denser population, and to other conditions favorable to disease. The apparent mortality of cities is also heightened somewhat by the death of many strangers who, as temporary residents, die while inmates of hospitals, orphan asylums, and foundling houses. Wealth, too, is characteristic of cities, but wealth is the mother of poverty and causes many indigent persons.[1] Wealth is acquired through commerce and manufactures carried on by individuals who themselves almost never become rich and who are thrown into the deepest misery by famine, a war, or an industrial crisis. The poor are shamefully neglected in the cities. When charitable funds are provided they are quite insufficient to meet the needs of the indigent. The state thus loses many subjects whose value would repay a hundred fold the expense of preserving them.

Great cities, because of their high mortality, are not an advantage to the human race. Large cities are a real evil,

[1] Vol. i, sect. 50. *Der Reichtum ist eine Mutter der Armuth, und er macht viele Durftigen.*

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and the damage they inflict upon the state is almost, if not quite, equal to that done by the pest. Cities are a necessary evil, which, while not curable, can be mitigated. Rulers should not strive to bring about an excessive growth of population in one or a few cities; they should endeavor to turn the urban migrants into many cities, and thus bring about a more equitable and harmonious distribution of the population. Morals, too, should be more strictly guarded in the cities, for although police regulations can instil no loathing for dissoluteness, nor make the people more virtuous, yet they can place obstructions in the broad avenues to vice and thus preserve many lives.[1]

In deaths by ages there is presented a most beautiful and perfect regularity.[2] The proportions existing between deaths at various ages and the total deaths seem to be little influenced by differences in the mode of maintenance among different peoples.[3] Though the causes of death are so multiple and various, yet all unite in the attainment of one firmly fixed purpose. All the different diseases have their definite limits and are under the control of the invisible hand of the Infinite, by virtue of which they must deliver their fixed number to the ordered total of deaths at every age. Fevers are universal diseases, but only so many die of the fever as is necessary to make full the quota of deaths for every age period. Where apparently there is the greatest confusion and irregularity, in reality everything moves harmoniously. All the numbers are proportioned to one another, the proportions are constant, they are approximately the same in all countries, and, what is more remarkable, all these proportions are brought about by a multitude of causes all diverse and in themselves subject to change.

When single years are compared great divergences are likely to appear in the deaths by ages, but the harmony in the proportions is disclosed when large numbers extending

[1] Vol. i, sect. 52. [2] Vol. ii, chap. xxii. [3] Vol. ii, sect. 436.

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over a period of several years are observed. The larger the numbers observed the more constant are the proportions.

A comparison of deaths by ages between such different groups as the nuns and Benedictine monks of Paris, the inhabitants of the Brandenburg villiages and of the Swedish provinces showed an astonishing agreement.[1] In this respect the statistics of Paris, Breslau, and Brunswick were also strikingly similar.[2]

From a comparison of several large and small cities, Süssmilch concluded that deaths were more numerous in the large cities in the age groups from twenty to thirty years, and in the small cities for the age groups above fifty years.[3] These facts demonstrate that the large cities lose an excessive number of men at the most useful period of their lives.

On the average, one-half of the people born into the world die before they attain to the age of twenty years. Mortality is high in early childhood, and it is highest during the first week of life. In the second year the vital powers are three or four times as great as in the first year. In the third year only one-half as many die as in the second. The decline in mortality continues until about the fifteenth year, when only two of every 1000 annually die. The mortality increases again about the twentieth year, the period of life when men begin to engage in severe labor, and are inclined to indulge in evil habits. Women, too, at this age are subject to all the dangers attendant on early womanhood.[4]

Süssmilch presents a table showing, first, how many die at every age of life, taking as a starting point 1000 births and assuming that 1000 are born and 1000 die annually; secondly, how many of the original 1000 remain alive at every age period; thirdly, how many of all ages are living in every age group; and, fourthly, how many die at every age period as

[1] Vol. ii, sects. 440, 441.
[2] Vol. ii, sect. 442.
[3] Vol. ii, sect. 448.
[4] Vol. ii, sect. 457.

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compared with the living.[1] Recognizing that this table does not represent the true state of affairs, Süssmilch yet thinks that it shows certain facts fairly well; as, for example, the probability of life, and the number of persons living within certain age limits. It furnishes also a basis for a rough estimate of the number of married persons and the number of children per marriage. He estimates that nine marriages, the parties to which are aged from 20 to 40, produce annually two children, or one such marriage gives one child every four and one-half years.[2]

From the data at his command, Süssmilch concludes that the duration of life is longer for females than for males; and that the power of females to sustain life is apparently greater at almost all ages of life than that of males. Struyck[3] and Kersseboom[4] had demonstrated this to be true for Holland.

The discussion of deaths by diseases is unsatisfactory and for good reasons.[5] The data relating to the subject were very limited in amount, and the nomenclature of diseases, at the present imperfect and lacking in uniformity, was then quite undeveloped. Süssmilch himself was fully aware of the difficulties in the way of a satisfactory treatment of the subject, and his conclusions are given as tentative. The true order or system of deaths by diseases can, he says, only be represented after careful observations of diseases and the collection of statistics for entire provinces and for a long period of years.[6] He thinks, however, the conclusion warranted that each disease has, as it were, its fixed quota for the grave.

From tables for London, certain small cities of England, Danzig, and Berlin, Süssmilch considers spring to be the most dangerous season of the year, and May the month of largest mortality. Summer and autumn are the most health-

[1] Vol. ii, sect. 461.
[2] Vol. ii, sect. 466.
[3] Vol. ii, sect. 477.
[4] Vol. ii, sect. 478.
[5] Vol. ii, chap. xxiv.
[6] Vol. ii, sect. 518.

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ful seasons. He is satisfied with the mere statement of fact, and leaves the causes of these phenomena to the doctors.[1]

The foregoing is a brief review of Süssmilch's most important ideas on the subject of population. In addition there are a few points touched upon which, perhaps, deserve notice. One chapter is given to a discussion of life annuities and tontines.[2] This chapter is scarcely more than a summary of the results obtained by Déparcieux in a work published in 1746.

Süssmilch performed an important service in bringing together information of much value from the view point of life insurance. While his data were entirely inadequate for the construction of a completely scientific life table, they seem to have had a practical application for a number of years, especially in Germany. In the second volume of the third edition (1765) of *Die Göttliche Ordnung* was presented a table showing the probability of living at every age for the kingdom at large (Prussia). "This table," says Walford, "was generally used in Germany during the last century (18th)." From this table was calculated the values of single and joint-life annuities for the Institution of Widows in the Duchy of Oldenberg, also for another institution of the same kind in Hamburg. "This," says Walford "was the first German mortality table, deduced from German data, and used in Germany."[3]

Dr. Price was acquainted with *Die Göttliche Ordnung*, and in the second edition of his *Reversionary Payments* (1772) included a table "which I have formed from a register in Süssmilch's works of the ages at which the inhabitants of a country parish in Brandenburg died." There was also included a table showing the probability of life at Berlin formed from data contained in *Die Göttliche Ordnung*.[4] In the sixth edition of his *Reversionary Payments*, Dr. Price

[1] Vol. ii, sects. 529–535.
[2] Vol. ii, chap. xxiii.
[3] Walford, *Insurance Cyclopedia*, vol. v, p. 312.
[4] *Ibid.*, p. 313.

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refers to "the ingenious Süssmilch,"[1] and adds, "that the tables in Süssmilch's book were made the basis of all the computations in Germany of the values of payments dependent on lives."[2]

Süssmilch's methods of calculating life probabilities were faulty, but with all the faults, his data, for lack of better, served a useful purpose in the early history of life insurance.[3]

Another chapter in *Die Göttliche Ordnung* is given to the discussion of the question, Is the Christian religion detrimental to the increase of population?[4] Montesquieu, in his *Persian Letters*, had contended that the population of Europe had decreased since Cæsar's time, and that the decrease had been chiefly due to the spread of Christianity and Mahometanism, religions less favorable to the increase of population than those which they replaced.[5] Süssmilch found it an easy task to expose the fallacies in Montesquieu's argument and to establish a strong case in support of Christianity as a religion more favorable to the increase of mankind than the religious systems which the Romans had in antiquity.

Still another chapter is devoted to a consideration of the question whether small or large states are to be preferred from the point of view of population. Süssmilch concludes that the size of the state is of much less importance than the industrial, economic, and social condition of its people.

III. Süssmilch's Place in Statistical Literature.

The discovery of the fact that vital phenomena conform to laws when large numbers are considered is to be attributed to an English writer of the seventeenth century, John Graunt, whose book entitled *Observations on the Bills of Mortality* appeared in 1662. A comparison and criticism of the baptismal and death registers for the city of London for the years

[1] *Reversionary Payments*, 6th ed., vol. ii, p. 69.
[2] *Ibid.*, p. 450. See also vol. i, pp. 133–136.
[3] *Cf.* Westergaard, *Theorie der Statistik*, p. 264.
[4] Vol. ii, chap. xviii.
[5] *Persian Letters*, Nos. 108–110.

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1629–61 led Graunt to conclude that the two sexes are nearly equal in numbers; that fourteen boys are born to every thirteen girls; that the ratio of births to deaths is quite uniform; and that population can be estimated if the number of deaths is accurately known.

Graunt was followed by Petty, who, in his chief work of 1676 on *Political Arithmetick*, endeavors to present a picture of the population and industries of Great Britain, Holland, Zealand, and France.

Among other English writers on population of about this period were Gregory King, who, in 1696, calculated the population of England from the hearth tax, levied in 1690 on 1,319,215 houses; and Edmund Halle, who, in 1693, made a report on the average expectation of life for each age, the basis of the calculations being tables drawn from the records of births and funerals in the city of Breslau.

Süssmilch was led to investigate the subject of population through a curiosity aroused by the remarkable conclusions reached by his English predecessors. *Die Göttliche Ordnung* is the result of an attempt to make a more detailed and elaborate analysis of population than the Englishmen had done.

Süssmilch lays relatively more emphasis upon the regularities which prevail in vital phenomena than had the previous writers. His main purpose is to determine the casual relations and conformities to law in the phenomena of births, marriages, and deaths when population masses are observed. His chief interest centers in the *Ordnung*, which is observable in the changes to which the human race are subject. By *Ordnung* he means the uniformity which prevails in the co-existence and sequence of vital phenomena. *Ordnung* with Süssmilch is used to express the same thing that is now commonly designated by the German words *Gesetze* and *Gesetzmässigkeit*.[1]

[1] Süssmilch at times used the word *Gesetze* interchangeably with *Ordnung*. See *Die Göttliche Ordnung*, vol. i, p. 51.

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In the emphasis placed upon the *Ordnung* which exists in the movements of population, and in the merely incidental importance which he attaches to statistical data as descriptive of the condition of a state or states, Süssmilch is widely separated from the school of statisticians best represented, perhaps, by Achenwall, whose chief work was first published in 1749.[1] The Achenwall conception of statistics makes the analysis of population important mainly because a knowledge of the number and condition of the population furnishes a valuable clue to the power and general welfare of the state. In this sense statistics is a description of the state for administrative and political purposes. Süssmilch deals only with statistics of population, but in the field thus limited he attempts to make as minute an analysis as the data at his command will permit. The data are gathered from every available source, and they are arranged, not primarily with a view to obtain a knowledge of the condition of any country or countries, but for the purpose of solving questions relating to the causal interdependence of certain events in human life.

The second edition of *Die Göttliche Ordnung* may be regarded as bringing to a successful close the first period in the history of population statistics.[2] The Belgian, Quetelet (1796–1874), was the next prominent writer to work along the lines laid down by the Englishmen of the seventeenth century; by Struyck and Kersseboom in Holland in the middle of the eighteenth century; and by Süssmilch, in Prussia.[3] The main purpose with both Süssmilch and Quetelet is to investigate the conformities to law in social life.

[1] *Abriss der neusten Staatswissenschaft der Heutigen vornehmsten europäischen Reiche und Republiken.*

[2] Knapp, *Théorie des Bevölkerungs-Wechsels*, p. 55.

[3] Curiously enough Quetelet seems not to have been acquainted with Süssmilch's work. Quetelet in his writings refers but once to Süssmilch (*Social Physics* (1835), vol. i, p. 198), and that reference was evidently taken from Sadler's *Law of Population*, vol. i, pp. 197–201. In the beginning (p. 91) of his book, *Physique Sociale*, Quetelet says: "L'homme nait se developpe et meurt d'après certaines lois qui n'ont jamais été étudiées dans leur ensemble ni dans le mode de leur réactions mutuelles." From this sentence Wagner thinks that Quetelet had no knowledge of Süssmilch's *Die Göttliche Ordnung*. (Wagner, *Statistik* in Bluntschli's *Deutsche Staats-Wörterbuch*, vol. x, p. 429.)

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They differ radically in the explanation assigned for the appearance of these regularities in phenomena so complex. Süssmilch thinks the explanation is to be found in a diviniy; Quetelet reduces the laws to mathematical formulas. The advance from Süssmilch to Quetelet is the advance from a theological, teleogical to a mathematical, physical conception of the conformities to law in social life. Quetelet demonstrates with even more thoroughness than Süssmilch that large numbers are essential in any determination of the regularities in vital and social phenomena. Quetelet's Budget,[1] however, recalls Süssmilch's "Zins zur Sterblichkeit."

A serious obstacle to careful investigation which all writers on population of the seventeenth and eighteenth centuries encountered was the lack of accurate enumerations of population. Throughout the seventeenth century, when enumerations were taken at all the large countries, they were generally limited to a single district, or to certain cities. If the population of the whole country was required it was estimated, various methods being employed. In the eighteenth century some advance was made, particularly in France and Prussia. Under Frederick the Great, beginning in 1748, enumerations of population were quite regularly made in Prussia.

In his calculation of typical averages, Süssmilch relies almost entirely upon the number of the living inhabitants enumerated in Berlin for the years 1747–1755,[2] and in Brandenburg for the year 1748.[3] These seem to have been the only actual enumerations upon which he based his calculations.

The main sources from which were derived the data contained in *Die Göttliche Ordnung* were the church registers

[1] "Il est un budget qu'on paye avec une régularité effrayante c'est celui des prisons, des bagnes et des échafauds; c'est celui-là surtout qu'il faudrait s'attacher à réquire." *Physique Sociale*, vol. i, p. 96.

[2] *Die Göttliche Ordnung*, vol. i, p. 263, and appx. p. 21. Bielefeld criticised the accuracy of the Berlin enumeration of 1747, but Süssmilch (vol. i, pp. 262–264) gives a very good answer to the criticism, maintaining that the count was taken with all reasonable accuracy.

[3] *Die Göttliche Ordnung*, vol. i, appx. pp. 2–8.

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of various cities, villages, or rural districts in Prussia, England, Holland, Sweden, France, and Italy. The English lists were fairly good from the close of the sixteenth century; the French lists from the middle of the seventeenth century; and the Prussian lists from the close of the seventeenth century. All these early lists were generally kept by the church, though often with the sanction and authority of the state. They were, therefore, records of baptisms, marriage ceremonies, and burials. Such lists are not as satisfactory as the data obtained by civil registration, where the purpose is to record the fact quite regardless of any ceremony which may or may not be connected with it.

When we consider how comparatively meagre were the data at Süssmilch's command, and how unscientific were the methods then employed to collect and compile statistics of population, it is really remarkable how many results he was able to obtain by skillful combination and keen analysis of his materials.

The principal statistical propositions advanced by Süssmilch must be regarded as fundamental for population statistics even in our day.[1] While his conclusions are generally to be accepted as true, he at times shows a tendency to interpret his data in too broad terms. He occasionally generalizes when the data upon which his argument rests are insufficient to warrant generalization. A striking example of this tendency is his assertion that, given the number of deaths, the population can be obtained by making use of certain multipliers which are assumed to represent the number of inhabitants to every death. From a calculation of the death ratios of Brandenburg, where the population was known from the enumeration of 1748, Süssmilch found that the population bore certain relations to the number of deaths, the ratios varying somewhat according as the population was for large cities, small cities, or rural districts. Having found

[1] Wappaus, *Studium in Statistik*, vol. i, p. 6.

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these proportions, he hastily assumes that, approximately, the same proportions hold true everywhere, and that it is only necessary to know the number of deaths annually occurring in a given locality to calculate the number of its inhabitants. It is obvious to anyone at all familiar with statistics that the number of deaths taken by itself would seldom prove a trustworthy index of the population of a country.

In his treatment of the statistics of marriages and births, and in his discussion of marital fecundity, Süssmilch relies least upon his predecessors. In the discussion of these subjects considerable allowance is made for the influence exerted by customs and economic conditions on the number of marriages and births, and on the average number of births per marriage.[1] The discussion of deaths and diseases, from this point of view, is much less satisfactory.[2]

Regarding *Die Göttliche Ordnung*, as a whole, its greatest fault, from a scientific standpoint, is its theological setting.[3] Even this fault may be largely excused, however, when we reflect that Süssmilch was a preacher. It is quite probable that if he had not felt that, as a preacher, he was bound to furnish some plausible excuse for meddling with economic and political questions, much less space would have been given to theological considerations.

Süssmilch's theory of population was undoubtedly largely influenced by the special circumstances of his own time and country. Prussia, in the eighteenth century, was rapidly extending her territory and developing her industries, and this expansion was particularly rapid during the reign of Frederick the Great (1740–86). As a youthful militant state, Prussia needed a larger population. Frederick's policy

[1] *Die Göttliche Ordnung*, vol i, sect. 99.

[2] *Ibid.*, vol. ii, sects. 441, 517.

[3] Süssmilch fell into the error that is noticeably incident to physical speculation generally in its pre-scientific stages. As a careful writer has well said, "it is observable how prompt is the conception that an apparent uniformity in the co-existences and sequences of phenomena constitutes an objective expression of a Divine Idea." T. E. Young, *On Centenarians*, p. 30.

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recognized this necessity. He held out every inducement to attract foreigners to his country. It is estimated that during the period from 1740 to 1756 over 100,000 colonists were introduced into the several provinces. Special incentives were offered to attract skilled artisans, and to persuade immigrants to settle upon Prussian lands. The system of colonization pursued by Frederick "had mainly in view the recovery of lands on which nature had not smiled; which the elements had laid waste; or which bad husbandry had left in neglect."[1]

Frederick's ideas respecting population, and the economic means best adapted to secure the greatest prosperity of the state, coincide with those advanced by Süssmilch. Encouragement of immigration, and a rigorous protective policy were parts of a scheme which sought to increase the fighting strength and tax-paying power of the state; to enlarge the annual production of grain, and thus lessen the dependence of Prussia on her neighbors; and to encourage manufactures with the object of securing a favorable balance of trade.

Prussia needed a large revenue. Frederick's policy was to secure an increase in the state revenues, not by levying new taxes, or by raising those already imposed, but by increasing the amount of taxable property and the number of tax-paying subjects.

Süssmilch, with an eye to the conditions prevailing in Prussia, naturally enough, gave an exaggerated importance to all measures wich might artificially stimulate the increase of population. In this connection it may be noted that Malthus, too, committed the same error, though his conclusions were quite the opposite of those reached by Süssmilch. Malthus, impressed with the conditions prevalent in the England of his day, formulated the principles of population in terms which exaggerated the strength of the tendency for a redundant population to arise. The situation in England

[1] Tuttle, *History of Prussia*, vol. iii, p. 95.

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at the time Malthus wrote was peculiar. It was an age of transition from the system of small industries to the modern system of large industries. Additions to the food supply were procured with great difficulty, while population was increasing rapidly under the stimulus of the newly-expanding industries, supplemented by the unwholesome encouragements of a vicious system of poor relief. "On every hand it was obvious that population was increasing; and that the numbers which were added were brought into the world without any real attempt to provide, by additional effort, for their subsistence."[1]

It is interesting to contrast the standpoints from which Süssmilch and Malthus regarded population, both being influenced by the special environments in which they found themselves. Süssmilch was thoroughly convinced that no danger could arise from an increase of population. In his view danger rather lurked in the unconcern of rulers to the proper encouragement of the increase of their subjects. Süssmilch held that population was nowhere too large but everywhere too small. He continually emphasizes the advantages which accrue to those countries which encourage the increase of their inhabitants. While he recognizes that the means of subsistence set an ultimate limit to population, and that checks to population often occur, owing to inferior methods of agriculture, long before the ultimate limit is reached, yet he always insists, not that the increase of population in such instances should be discouraged, but that every possible effort should be made to improve the methods of agriculture, and thus provide for a further growth of population.

Malthus, like Süssmilch, favored large populations, but he saw no necessity for encouraging the increase of population under any circumstances. In his view the tendency of popu-

[1] Cunningham, *Growth of English Industry and Commerce in Modern Times*, pp. 562–564.

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lation to increase is so strong that it requires to be curbed rather than stimulated. Unless the conditions are special, as in a period just subsequent to war, or in a new country, population is always sure to be as large as is desirable under the circumstances of time and place.

To put the contrast between the standpoints of Süssmilch and Malthus in a word, Süssmilch favored removing all checks to the increase of population, and making every possible provision for its promotion, while Malthus was thoroughly convinced that checks to population are necessary and always in operation, and that the question is not how to remove them, but how to make such a selection of them as will result in the production of the least misery and vice.

Süssmilch, as we have seen, emphatically denies that wars, plagues, or famines are necessary to maintain an equilibrium between population and means of subsistence. While it cannot be said that Malthus favors wars, plagues, or famines, he does seem to look upon them as necessary checks to population in certain stages of civilization. As society advances ravaging epidemics become less frequent, other milder checks being powerful enough to prevent a redundant population. With the further progress of civilization war, too, abates. As these positive checks gradually cease to operate, the preventive checks, generally involving less misery, act more powerfully. The conclusion is that the preventive check which involves restraint from marriage, unaccompanied by irregular gratifications, is the one best adapted to regulate population with the minimum of vice and misery.[1]

One other illustration may serve to make clear the distinction between the views of Süssmilch and Malthus. Süssmilch favored the encouragement of matrimony, and considered it one of the principal duties of government to increase the number of marriages. He thinks that a statesman would be deserving of a high reward if he could increase

[1] Malthus, *The Principle of Population*, 7th ed., p. 262.

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the number of marriages from the proportion of 1 to 120 or 125, to the proportion of 1 to 80, or 1 to 90.[1] Malthus emphatically denies the utility of applying any stimulus with a view to promote marriage. "The natural tendency to marriage is in every country so great that, without any encouragements whatever, a proper place for a marriage will always be filled up. Such encouragements, therefore, must either be perfectly futile, or produce a marriage where there is not a proper place for one; and the consequence must necessarily be increased poverty and mortality."[2]

This is simply one example illustrating the firm stand taken by Malthus against the application of any artificial stimulus with a view to increasing population.

Malthus was acquainted with *Die Göttliche Ordnung*, but there is no evidence that his views were influenced by it. When he wrote his original essay in 1798 he evidently had not seen Süssmilch's book, for extracts from a table by Süssmilch were obtained second-hand from one of Dr. Price's notes.[3] In the later editions of his work Malthus frequently refers to Süssmilch's book, upon which he largely drew for statistical data respecting the condition of the populations of middle Europe.

Süssmilch and Malthus may be said to represent the poles between which opinion respecting the increase of population has fluctuated. Opponents of Malthus point to France as a striking example of the results of Malthusianism. In that country the natural growth of population has been for some years practically *nil*. While the supporters of Malthusianism hold that this condition of affairs is representative of a high state of civilization, accompanied by large and generally diffused prosperity, there are not a few Frenchmen who look upon the abnormally low birth rate in France as an evil which ought to be remedied, if necessary by state action.

[1] *Die Göttliche Ordnung*, vol. i, p. 152.
[2] *The Principle of Population*, 7th ed., p. 159.
[3] Malthus, *Essay on the Principle of Population*, 1st ed., p. 114.

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A high birth rate is considered by this class of thinkers essential as a measure for national defence. It is the Süssmilchian idea as opposed to the Malthusian doctrine.

In conclusion it may be said that *Die Göttliche Ordnung* must be regarded as an important contribution to the literature of population statistics. It is important not so much because of originality, though considerable originality is displayed, particularly in the treatment of marriages and births, but rather because it is the first complete study of population for its own sake. It stands as the first systematic compend of facts bearing upon the many complex questions connected with the static condition and dynamic changes of population.

IV. Bibliography of the Writings of Johann Peter Süssmilch.

A list of the writings of Süssmilch may properly be considered an essential supplement to the preceding sketch of his life.[1] They indicate the intellectual achievements of the man from 1732, the date of the publication of his thesis, to 1765, when, two years before his death, he published his second and last revision of the work to which he had devoted a large part of his life.

A Chronological List of the Printed Works and Manuscript Writings of Johann Peter Süssmilch.

Dissertatio de cohaesione et attractione corporum. Jenae, 1732. Lit. Ritterianis. 4to. 39 pp.

Die göttliche Ordnung in den Veränderungen des menschlichen Geschlechts, aus der Geburt, Tod, und Fortpflanzung desselben erwiesen. Berlin, 1741. J. C. Spener. 12mo. (First edition edited by Süssmilch himself.)

Die göttliche Ordnung in denen Veränderungen des menschlichen Geschlechts, das ist, gründlicher Beweiss der göttlichen Vorsehung und Vorsorge für das menschliche Geschlecht, etc. Berlin, 1742. D. A. Gohls. 12mo.

Das Frolocken der Brandenburgischen Lande über dem glücklich geendigten Kriege. In einer Predigt. Berlin, 1742. 4to.

[1] See chap. i.

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Die Wichtigkeit einer guten Erziehung, in einer Predigt am ersten Sonntag nach Epiph., 1743, in hiessiger St. Petri Kirche vorgestellet. Berlin, 1743. Christian S. Bergemann. 4to. 8 pp.

Réflexions sur la convenance de la langue celtique et en particulière de la teutonique avec celles de l'orient. Berlin, 1745. Ak. d. Wiss.

Anweisung zum frölichen und Gottgefälligen Lob-Gesang über dem am 4ten Junius, 1745, bey Strigau erhaltenen herrlichen Siege in einer Danck-Predigt am letzten Tage des Pfingst-Festes in der Gemeine zu St. Petri in Cölln vergestellet. Berlin, 1745. 4to. 24 pp. (Printed with the Henning manuscripts.)

Das unvergessliche Denkmahl der Wunder, so Gott durch die bisherigen siegreichen Unternehmungen Sr. Königl. Majestät von Preussen gestiftet, in der am 4ten Sonntage des Advends 1745 verordneten Dankpredigt der Gemeine zu St. Petri in Cölln über Psalm 8, v. 4 erkläret. Berlin, 1745. 4to. 18 pp.

Die Unvernunft und Bosheit des berüchtigten Edelmann's durch seine schändliche Vorstellung des obrigkeitlichen Amtes, aus seinem "Moses mit verdecktem Angesichte" dargethan, und zu aller Menschen Warnung vor Augen gelegt. Berlin, 1747. 8vo.

Der Brandenburger Patriot oder unparteiische Beurtheilung der errichteten und von Sr. Königl. Majestät in Preussen octroyrten Handlungsgesellschaft. 1751.

Der Königl. Residentz Berlin Schneller Wachsthum und Erbauung. In zweien Abhandlungen erwiesen. Berlin, 1752. Haude und Spener. 4to. 80 pp. 1. Abhandlung von dem schnellen Wachsthum Der Königl. Residentz Berlin vorgel. in dem Versammlung der Königl. Ak. d. Wiss., Feb. 6, 1749. 2. Abhandlung von dem Alter und der Erbauung der Städte, Berlin und Cölln, worinn hochstwahrscheinlich dargethan wird, dass der Marggraf Adelbert, der Bär, als der Eroberer und Bezwinger der Mittel-Marck Brandenburg, auch der Erbauer dieser Stadt sei. In der Versammlung d. kgl. Ak. d. Wiss., im October, 1750, abgelesen.

Die gewisse Hoffnung einer seligen Unsterblichkeit als der Grund des getrosten Muthes der Gerechten im Tode. . . . Leichen-Predigt der Herr Christian Campen, Kgl. Preuss. Inspectoris. Berlin, 1752.

"Verzeichniss Teutscher Wörter in der Altbritischen Sprache" in the "Dictionnaire de la Langue Bretonne," by Louis Le Pelletier. Paris, 1752.

Bekehrung des Rabbi Jachiels. Berlin, 1754. Bienstiel.

Bekehrung des Rabbi Jachiels. Berlin, 1758. Lange. 8vo.

Gottgefällige Glückwünsche bey dem Eintritt in das 1755. Jahr Predigt. Berlin, 1755. 4to. 16 pp.

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Die göttliche Ordnung in den Veränderungen des menschlichen Geschlechts, besonders, im Tode, durch einige neue Beweissthümer bestätiget, und gegen des Königl. Gross Brittannischen Berg-Raths Herrn von Justi Errinerungen und Muthmaassungen in zweien Send-Schreiben an selbigen gerettet. Berlin, 1756. Haude and Spener. 4to.

Dank-Predigt wegen der am 1 Oct., 1756, von des Königs von Preussen Maj. über die Oesterreichische Kriegesmacht erfochtenen herrlichen Sieges. . . . Berlin, 1756. 4to. 16 pp.

Die abermalige Aufforderung zur Verehrung des Herrn durch den Sieg bei Leuthen in der Dank-Predigt erklärt. Berlin, 1757. 4to. 12 pp.

Heilsame Wirkungen des Tages des Schreckens durch den feindlichen Ueberfall der Stadt Berlin. Berlin, 1757.

Der grösste und herrlichste unter allen bisherigen Siegen, welchen das Kgl. Preussiche Heer am 6ten May, 1757, bey der Böhmischen Hauptstadt Prag unter göttlichem Beystande erfochten. Dank-Predigt. Berlin, 1757. 4to. 16 pp.

Die Freude über die Güte und Hülfe Gottes an dem Dank- und Siegesfeste wegen des am 5ten Nov., 1757, bei Freyburg . . . verlichenen hochstwichtigen Sieges in einer Predigt . . . vorgestellet. . . . Berlin, 1757. 4to. 16 pp. Reprinted at Schwabach, 1758. 4to. 12 pp.

Gedancken von den Epidemischen Krankheiten und dem grössern Sterben des 1757ten Jahres. Berlin, 1758. 4to. Haude and Spener.

Der grosse Sieg bey Zorndorf . . . als eine Ursache der dankvollsten Freude am 15ten Sonntag nach Trinitatis . . . erkläret. Berlin, 1758. 4to. 22 pp.

Essai sur le Nombre des Habitans de Londres et de Paris. 1759. (Translation.)

Die göttliche Ermunterung zum Gebet um Friede . . . Neujahrs-Predigt. Berlin, 1760. 4to. 16 pp.

Jesus als das beste und nachahmungs würdigste Muster unserer Kindheit und Jugend. A sermon delivered at Cölln the first Sunday after Epiphany, 1701. 8vo. 16 pp.

Betrachtung einiger Bewegungsgründe zur Barmherzigkeit und thätigen Mitleiden mit seinem Nächsten. . . . Berlin, 1761. 4to.

Die göttliche Ordnung. Berlin, 1761–62. Im Verlag der Buchhandlung der Realschule. 2 vols. 8vo. (Second edition edited by Süssmilch himself.)

Der Bund des Friedens und der Freundschaft mit Russland, als ein herrliches Gnadengeschenk Gottes. Berlin, 1762.

Catalogue librorum collegit, Dr. J. P. Süssmilch, notasque litteraris criticas nonnullis libris addidit Dr. J. C. König. Berlin, 1768. G. L. Winter.

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Die göttliche Ordnung. Berlin, 1765. G. L. Winter. 2 vols. 8vo. (Third and last edition edited by Süssmilch.)

Vorrede zu Krauss' richtiger Chronologie der Bücher der Könige. Jan. 10, 1765.

Vorrede zu Samuel Buchholtz's Versuch einer Geschichte der Churmarck Brandenburg. Berlin, 1765–75. 4to.

Versuch eines Beweisses, das die erste Sprache ihren Ursprung nicht von Menschen, sondern allein vom Schöpfer erhalten habe. Berlin, 1766. 8vo.

Posthumous Publications.

Specimen etymologici Latini, seu glossarii harmonici Latino-Phoenicii. Bibliotheca Hagana. 1768. 8vo.

Centinuatio Speciminis Etymologici. Bibli. Hagana. 1768. 8vo.

De goddelyke orde, herrschende in de veranderungen van het menschelyk geschlacht, etc. Amsterdam, 1770–72. P. Meijer. 4 vols. 8vo.

Die göttliche Ordnung. Edited by Ch. J. Baumann. Berlin, 1775–76. 3 vols. 8vo. Im Verlag der Buchhandlung der Realschule. (Fourth edition. Revision by Süssmilch's son-in-law.)

Die göttliche Ordnung. Berlin, Halle (printed) 1787–88. (?)

Die göttliche Ordnung. Berlin, Halle (printed) 1798. 8vo.

Manuscript Writings (of which some may have been printed).

Otium Pyrmontanum h. e. dissertatio de origine lapidum, etc. 1745.

Mémoire sur l'origine et l'age de la Ville de Berlin lu à l'Académie Oct. 20, 1750.

Observationes in linguae britannicae . . . naturam. April 26, 1752.

Anmerkungen zu des Herrn Brownriggs (Bevölkerungs) Rechnung von Bristol. In der Ak. d. Wiss. gelesen am 28ten Nov., 1754.

Dissertatio, dass die Menschen nach einer gewissen Regel sterben. In der Ak. d. Wiss. gelesen am 28ten Nov., 1755.

Dissertatio academica qua convenientia caracterum numericorum, litterarum, initialium . . . ostenditur. April 29, 1757.

Dissertatio de Herulis. Oct. 27, 1757.

Five letters written to J. D. Michaelas, dated Berlin, 1758–66, with a statistical abstract "General Liste aller Gestorbenen, Geborenen, und Verheyrateten in allen Kgl. Preuss. Provinzen," containing the total sums for 1751 and 1756.

Teile eines Glossarium Harmonicum.

Commentatio de pago antiquo brandenburgico Belchem.

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Commentatio de Stedingis.

Positiones de Theologia morali.

Varia collectanea ad historiam sacram, etc.

Remarques sur l'histoire de Brandenbourg.

Anmerkungen zu Mich. Geddes Betrachtung der Mittel wodurch die Römische Kirche ihre Leute zurückhält, dass sie nicht zu Erkenntniss der Irrthümer gelangen, so sich in ihrem Glauben . . . befinden.

Schediasma de bibliorum editionibus rarioribus.

Ob die Religion der Römer vor der christlichen in Ansehung der Bevölkerung eines Landes den Verzug gehabt.

Vorschlag zu einer "Historia naturalis patriae."

Réflexions sur le traité l'homme machine.

Mémoire sur la diminution des mariages et des naissances de quelques provinces de S. M. Roi de Prusse depuis l'an 1754 jusqu' à 1740.

Von der Gefahr der grossen Städte.

Dissertatio problematica, num navigatio et expeditio in terras australes utilis esse possit, et ubi primae sedes sint stabiliendae.

Berechnung des Schadens, welchen die preussichen Lande durch epidemische Seuchen und Kriege in den drei Jahren 1756–58 erlitten haben.

Abhandlungen, worin erwiesen wird, dass der westliche Theil von Europa, besonders Teutschland, zu Julius Cäsar's Zeiten nicht vielmal volkreicher gewesen sein könne als es anjetzo ist; ja dass es damals nicht die Hälfte der jetzigen Einwohner ernähren können. (See "Deutsche Biographie," xxxvii, 193.)

Betrachtungen über die Religion.

It is as an author, and, particularly, as a writer on population statistics that Süssmilch is entitled to recognition from posterity. As the above bibliography indicates, his writings comprise several pamphlets which treat of etymological subjects, some sermons, and a considerable number of statistical pamphlets. His chief merit and fame, however, rest upon one book, *Die Göttliche Ordnung*, which may properly be said to have constituted his principal life work. "*Die Göttliche Ordnung*," says Süssmilch's eulogist, "was properly the occupation of his whole life, the center of all his reflections. After he had formed the plan, he never for

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a moment lost sight of it. He gathered from all sides the aids which might enable him to perfect it. He consulted the wise men whose knowledge might widen his own. In a word, never was author seen more filled with his subject, more given over to that sort of enthusiasm which persuades that there is nothing better than what one is doing, and that one is doing it the best that it can be done."[1]

The first edition of *Die Göttliche Ordnung* was published at Berlin in 1741.

This genuine, original work was followed in 1742 by what John[2] considers to have been an unauthorized edition, an exact copy of the original except that it has a changed and more extended title.[3]

Both imprints of this early edition are extremely rare, and there is, therefore, good reason to believe that only a few copies were printed.[4]

This early edition of *Die Göttliche Ordnung* contains two prefaces; one by the author, and one by the philosopher, Christian Wolff.[5] The author's preface is dated, "On the

[1] Formey in *Histoire de l'Académie Royale des Sciences et Belles-lettres.*

[2] John's *Geschichte der Statistik*, footnote, p. 242.

[3] The title page of the 1741 edition runs as follows: "Die göttliche Ordnung in den Veränderungen des menschlichen Geschlechts, aus der Geburt, Tod, and Fortpflanzung desselben erwiesen von Johann Peter Süssmilch, Prediger beym hochloblichen Kalcksteinischen Regiment. Nebst einer Vorrede Herrn Christian Wolffens."

The 1742 edition bears the following title: "Die göttliche Ordnung in denen Veränderungen des menschlichen Geschlechts, das ist, grundlicher Beweiss der göttliche Vorsehung und Vorsorge für das menschliche Geschlecht aus der Vergleichung der Gebohrnen und Sterbenden, der Verheiratheten und Gebohrnen, wie auch in sonderheit aus der beständigen Verhältniss der gebohrnen Knaben und Mädgens, wobei accurate und Vieljährige Listen der Gebohrnen und Gestorbenen in allen königlichen Preussichen Ländern, in London, Amsterdam, Paris, Wien, Berlin, Breslau, u. s. w., daraus der Wachsthum und die Anzahl der Einwohner in selbigen Ländern und Städten bestimmet wird, nebst einem Versuch, die Verhältniss der Sterbenden nach dem Alter und nach denen Kranckheiten zu bestimmen und einer Anweisung zur nützlichen Einrichtung der Kirchen-Bücher, u. s. w.

[4] The present writer has never seen a copy of the 1741 edition, but was fortunate enough to obtain for examination a copy of the 1742 imprint, in the Surgeon-General's Library, at Washington.

[5] Wolff's preface may be characterized as a commendation of the book and an apology for its appearance. In the middle of the eighteenth century mathematics was the dominant science. The one requisite that was then thought to constitute the all-in-all of any body of knowledge was exactness. . . . Wolff in his preface endeavors to anticipate any

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march to Schweidnitz, March 27, 1741." The dedication is addressed to Frederick II, now better known as Frederick the Great.[1]

In the preface to the first edition of *Die Göttliche Ordnung* Süssmilch says that he was led to investigate the subject of population by the perusal of Derham's *Physico-Theology*, which contained among other things a summary of the observations made by Englishmen concerning lists of births, deaths, and marriages. "Because these remarks were new to me, a desire was awakened for further investigation, and as the great utility of these truths was plainly evident, I became attentive to everything which might strengthen them. When I came back to Berlin from the University[2] there fell into my hands some additional lists, both from Berlin and for the whole country. To my great satisfaction I observed an almost complete agreement of our countries with England in these matters. I got together everything that I could find. The contributions which had been made for some years in Breslau to medicine, physics, and other sciences contained many lists . . . which in great measure confirmed the order observed by the Englishmen . . . As I was gradually led ever farther, the writings of the Lord-Mayor Graunt and of the Knight Petty fell into my hands. . . . To Graunt belongs the highest praise, for he first broke the ice over these new truths, and he first tried, in the search for them, to make use of the London lists. Petty soon followed, and

objection that might be urged against the ideas advanced by Süssmilch on the ground of their exactness. "It was a great folly," says Wolff, "to rather remain entirely ignorant of a thing than be content with a knowledge in which there is not complete certainty. . . . Proofs have been given how probable theories may be turned to account in human life. The present author's book is such a proof, for none can well deny that the knowledge of those things of which he treats have their manifold uses. No one can demand of him demonstrated truths where the probability must satisfy, and those who entirely condemn the undertaking because no certainty is to be had betray their own folly."

[1] Süssmilch, in the preparation of his book, had experienced how extremely difficult it is to gather statistical data without the aid of government. The work is dedicated to the King in the hope that he might see fit officially to promote and encourage the collection and compilation of data relating to population statistics.

[2] It is uncertain what date is here referred to.

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in his attempts in political arithmetic not only accepted and confirmed many of Graunt's propositions but also clearly demonstrated their utility in politics and administration."[1]

When Süssmilch had completed the rough draft of his book he was deterred for a time from publishing it, by the appearance of two new works dealing, in part, with the same phenomena. The first was Maitland's *History of the City of London*, published in 1739, which contained numerous observations on the London lists, which had then been kept for more than a century. The second book was Struyck's *Einleitung zur Geographie*, published in the Dutch language in 1740.

Struyck had brought together the main facts found in Graunt, Petty, and Maitland and had added some new lists for Holland. Struyck's attention was chiefly directed to the political uses of these lists, and especially to their utility in determining life annuities. "But, as for the rest," says Süssmilch, "it appears that Struyck desired rather to collect these data for the first time than to give a complete treatment. Therefore, after some delay, I held to the conclusion I had once formed, especially since all the works mentioned are rarely found and little read in our country."[2]

The election of Süssmilch to membership in the Berlin Academy, in 1745, seems to have been largely due to the publication of *Die Göttliche Ordnung*. After his admission to the Academy, Maupertuis, its president and Frederick's literary assistant, urged him to make the observations contained in his book subjects for discussion before the Academy. The invitation was accepted, and in this way many improvements and extensions were made to the first edition. Süssmilch seems always to have taken a lively interest in the

[1] Preface to the first edition of *Die Göttliche Ordnung*.

[2] Besides Struyck, Kersseboom wrote in Holland (1737–42) on the subject of population. Süssmilch, in his first edition, was unacquainted with Kersseboom's writings, and Kersseboom, though he wrote two pamphlets in 1742, was not acquainted with Süssmilch's work. Knapp, *Theorie des Bevölkerungs-Wechsels*, p. 76.

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proceedings and an active part in the discussions of the Academy.

There is no reason to suppose that the first edition of *Die Göttliche Ordnung* was widely read or attracted much attention beyond the local circle of Berlin. It is important to note, however, that there was one critic whom Süssmilch attempted to answer.[1] Von Justi, in the *Gottingen Policey-Amts-Nachrichten*, took occasion to question some of the conclusions reached by Süssmilch, and particularly the statement that more persons die, reckoned on the basis of the total population, in the cities than in the country districts. Von Justi took opposite ground declaring that more people die in the rural districts than in the cities, as compared with the respective populations. Von Justi asserted that deaths were less frequent in the cities proportionately to population because of the large number of temporary residents, the majority of whom were of an age when deaths are comparatively infrequent. He held that the city inhabitants were largely composed of servants, coachmen, travelling artisans, soldiers, etc., together forming an element of the population sufficiently important to reduce the death rates in the cities below those of the rural districts. In *Die Göttliche Ordnung* the deaths in cities had been given as, on the average, about one in thirty, and in the country as about one in forty of the living inhabitants. Von Justi claimed that in cities one in sixty, or in very populous cities, like London and Paris, one in one hundred would represent the proportion more nearly corresponding to the facts.

In 1756 Süssmilch published two letters in answer to this criticism of Von Justi and to other minor criticisms by the same author. After a careful analysis of all the data obtainable, he had become strengthened in the opinion that death

[1] Criticisms upon *Die Göttliche Ordnung* appeared in the *Gottinger Gelehrten-Anzeigen* (1756, 1761, and 1762). These were written by Haller, and were concerned with the physiological and scientific aspects of Süssmilch's researches. Wappaus, *Studium der Statistik*, p. 79.

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rates are higher in the cities than in the rural districts.[1] The facts which were presented at this time, and the conclusions reached, are given in substantially the same form in the second edition of *Die Göttliche Ordnung*, published in 1761 and 1762.

This second edition is an entirely new revision of the first. A comparison of the two as regards size will give some idea of the extensions which Süssmilch had seen fit to make during the twenty years (1741–61) which separated them. The first edition was a small octavo volume of 356 pages. It contained nine chapters, and an appendix of eighteen tables. The second edition is composed of two quarto volumes of 576 and 625 pages, respectively, exclusive of the appendices, which together contain sixty-eight tables. The chapters have increased from nine to twenty-five.

If further evidence is wanted to prove how much labor must have been expended in recasting the first edition, we have Süssmilch's own testimony. He informs us that his evening hours for a period of two years were spent in revising a single chapter.[2] When at last he determined to rewrite the whole book, he labored at the task during all his spare time for a period of three years before the first part was sent to the press.[3]

This new edition is also dedicated to Frederick II, who had given, says the author, convincing proofs of his discernment of the utility of the observations contained in the first

[1] For a long time after the publication of these letters Von Justi made no rejoinder, directly or indirectly. Soon after the letters were published, Süssmilch met Von Justi, but his critic gave no hint that he still held to his former opinions. Süssmilch naturally assumed that this silence indicated Von Justi's conversion. He was mistaken. In 1760, Von Justi published a work on *Staatswissenschaft*, in which he held to his former opinions without any modifications or further proofs in support of them. This book did not come to Süssmilch's notice until the first part of the second edition of *Die Göttliche Ordnung* was nearly printed. Süssmilch confessed his astonishment at Von Justi's course, but did not think it worth while to reopen the controversy. *Die Göttliche Ordnung*, 2nd ed., vol. ii, note pp. viii–x.

[2] This statement is made in the second letter in answer to Von Justi. The chapter to which reference is made is chap. vi, Deaths by Ages.

[3] Preface to the second edition of *Die Göttliche Ordnung*.

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edition.[1] The king, too, throughout his reign had demonstrated that he held a rational *Bevölkerung* to be the chief duty of a ruler, and had given a substantial proof of the importance which he attached to data relating to population. In June, 1747, he had ordered, not only that lists should be drawn up in all the Prussian provinces, but, in addition, data was to be collected for the preceding fifteen years.[2]

In 1765 appeared the third edition of *Die Göttliche Ordnung*. This was the last edition to come under the author's eye.

The original edition contained the germ of all the more important ideas found in the later editions. The ideas are put in a better dress in the later editions; the arrangement, while still in many ways unsatisfactory, is more logical; and the larger amount of data at the author's command naturally necessitated the introduction of slight corrections in some of the many ratios which had been presented in 1741.[3]

[1] One imprint of this second edition contains, besides the dedication to Frederick the Great, a dedication to Peter III of Russia.

[2] John, *Geschichte der Statistik*, pp. 270, 271.

[3] Knapp's assertion (*Theorie des Bevölkerungs-Wechsels*, p. 76) that the second edition of *Die Göttliche Ordnung* has risen from an insipid theodicy to a national economic and political work is perhaps a little misleading. While the theological considerations do not form so large a part of the second edition as of the first, there are quite as many of them in the later edition. In the extensions, however, emphasis was laid upon the scientific, rather than upon the theological discussions. From this point of view, the later edition is less dominantly theological than the first, though the theological undercurrent is still strong.

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CONTENTS.

I. PERMANENT CENSUS OFFICE 381

II. REVIEWS AND MISCELLANY:—

Notes on Foreign Censuses. *C.-E. A. Winslow*, . . 443

Notes on Vital Statistics of American Cities. *C.-E. A. Winslow*. 449

Statistics of Diseases. *C.-E. A. Winslow*. 452

Cost of Home-Cooked and Purchased Food. *Ava M. Stoddard*. 461

A Study of Municipal Growth. *F. S. Crum*. . . . 464

Early Congressional Documents. *L. P. L.* . . . 466

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AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, No. 56. DECEMBER, 1901.

PERMANENT CENSUS OFFICE.

Under date of December 4, 1901, a report on the establishment of a permanent Census Office has been submitted by the Director of the Census, Hon. W. R. Merriam, for the use of the Congressional Committees on the Census. As it is likely that only a very limited edition will be printed, it appears desirable to give the report a wider circulation by reprinting it in the *Publications of the American Statistical Association*. The report is prefaced by the following explanatory note signed by the Director of the Census: —

In compliance with requests made by the Chairman of the Committees on the Census of the United States Senate and House of Representatives, an account is presented in the following pages of the efforts which have been made in the past to secure the establishment of a permanent census office, and a summary of the arguments by which this movement was supported. At my request the Assistant Director of the Census and Chief Statisticians have submitted their views on this important subject, based on their actual experience in census work. These statements form Part II of this pamphlet.

PART II.— HISTORICAL SUMMARY.

The establishment of a permanent census office was first advocated by Gen. Francis A. Walker, the able Superintendent of the Ninth and Tenth censuses, in an article contributed to the *Quarterly Journal of Economics* for January,

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1888. Speaking from his experience of the difficulty of collecting and digesting, in any reasonable time, the enormous amount of material dealt with in the census of 1880, he said: "What is eminently to be desired in the interests of our statistical service is that the census should be confined to an enumeration of population, coupled only with one other class of statistics, to be hereafter mentioned, such an enumeration to be conducted once in ten years, as now, or better, once in five years, as befits so great and rapidly growing a people; while the remaining statistical inquiries now connected with the census, and even many others required to meet the increasing demand for exact knowledge, should be set on foot and conducted in proper succession by the same bureau of the Government during the intervals of the decennial or quinquennial censuses. Such a system would dispense with the necessity for suddenly raising and suddenly disbanding a large office; would retain permanently in service a considerable force of trained clerks, enabling them to acquire skill, insight, and rapidity of working by continuous experience; and would thus at once diminish the cost and increase the value of the results obtained."

The only class of statistics which, in the opinion of General Walker, ought to be collected at the same time with the statistics of population relates to agriculture. "It would be inexcusable to require the entire surface of the United States to be gone over a second time, on foot or on horseback, for the purpose of collecting the productions of five millions of farms."

He did not, however, in this article, advocate the creation of a permanent census office. "The Census Office has expired by limitation of law. Instead of reviving it in 1888 or 1889, let the taking of the Eleventh Census be charged upon the existing Bureau of the Statistics of Labor, in the Department of the Interior — the department which, since and including 1850, has had supervision of the work."

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Mr. Carroll D. Wright, United States Commissioner of Labor, in the *Popular Science Monthly* for November, 1891, expressed his substantial agreement with the views of General Walker. "The very worst form [feature] of the present feature is the temporary nature of the service. * * The first step toward correction lies in the direction of the establishment of a permanent census office, under which there ought to be a constant force of trained and experienced statistical clerks, and the collection of facts [should be] distributed over ten years, instead of being crowded into a few months. * * This would involve the employment constantly of a much reduced office force, and a field force, except for the enumeration of the population, gradually becoming more and more skilful. The expense during the whole ten years would be somewhat larger than is involved, but the results would be of such infinitely greater value, that the increased expense would not be a matter for a moment's consideration."

Senate's Resolution.

The Senate of the United States had already adopted, February 16, 1891, a resolution directing the Secretary of the Interior to consider the expediency of the establishment of a permanent census bureau, and to embody the results of his consideration with a draft of a bill, should he consider it expedient, for the establishment of such census bureau, in a special report to be made to the Senate at the opening of the Fifty-second Congress.

Special Report by Robert D. Porter.

The task of preparing this report devolved, by order of the Secretary, upon Mr. Robert P. Porter, Superintendent of the Eleventh Census, who performed it in a most thorough manner. Senate Doc. No. 1, Fifty-second Congress, First Session, contains, in addition to a convincing argu-

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ment in favor of the proposed permanent office, supported by extracts from communications on this subject received by him from numerous officials, statisticians (American and European), churchmen, and representatives of commercial organizations in all parts of the United States, the draft of "a bill to establish a permanent census office and to provide for taking the Twelfth and subsequent censuses." This bill changed the date of the census from June 1 to October 1, and ordered, in addition to the decennial "census of the population, wealth, and industry of the United States," a "periodic collection of vital and social statistics, and of statistics of agriculture, manufactures, mining, fisheries, churches, education, finance, transportation, and insurance." In the organization of the office force, provision was made for the appointment of "five expert chiefs of divisions." The number of supervisors of census was increased from one hundred and seventy-five to three hundred, and their minimum compensation from five hundred dollars to one thousand dollars. The employment of interpreters to assist the enumerators was authorized. The size of enumeration districts was reduced from 4,000 to 2,000 inhabitants. Answers to questions in the census schedules were made obligatory upon the officers of all establishments of productive industry, and not, as theretofore, upon officers of corporations only. Appointments in the Census Office, except of trained clerks and experts of the Eleventh Census, were directed to be made with accordance with the terms of the Civil Service Act. A section was inserted, which was copied from the Census Act of 1875, but had been omitted from that of 1889, pledging the Government to pay one-half the cost of each quinquennial census taken by any state or territory, upon condition of a previous deposit with the Secretary of the Interior of a certified copy of all schedules and reports returned by the officers and agents charged with such enumeration. In other respects this bill was very

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nearly a verbatum copy of the Census Act of 1889. It contained thirty sections.

In the appendix to the report will be found a chronological review of legislation concerning the decennial census, an article by Mr. J. J. Noah on the advisability of reducing the decennial to a lesser census period, and the forms of the census schedules used from 1790 to 1870, inclusive, and those schedules which were placed in the hands of the census enumerators (in whole or in part) in 1880 and 1890.

The Porter Bill.

The bill drafted by Mr. Porter was introduced in the Senate, December 18, 1891, by Senator Hale (S. 690), read twice, and referred to the Committee on the Census.

1892.

Hearing by the House Committee.

At the second session of the Fifty-second Congress, a resolution was adopted by the House of Representatives, instructing the Select Committee on the Eleventh Census to inquire into the expediency of establishing a permanent census bureau. That committee had a hearing on the subject, beginning March 25, 1892, at which ten witnesses made statements, among whom were Mr. Porter, General Walker, and Mr. Wright.

Mr. Porter emphasized the lack of sufficient time, under the present system, for the necessary preparation for taking the census. He advocated reform in the employment of expert special agents, and a modification of their relation to the office. He said that the statistics of manufactures in cities and towns having 2,500 inhabitants can be better taken by special agents paid by the day than by enumerators paid by the schedule. He advised the retention of a skeleton force "made up of people who are really statisticians," which should be under civil service rules, "and

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the privilege should be given to employ temporary people when the census is taken, who should have some special examination." He proposed the elimination from the census of the inquiries relating to fisheries; transportation; insurance; Indians; farms, homes, and mortgages; education; and veterans of the civil war. These inquiries (omitting education) in the Tenth Census cost in the aggregate $2,050,000. The census of the population should be under the immediate direction of the superintendent, and the other work of the office supervised by five expert statisticians, one each for manufactures, agriculture, social statistics, vital statistics, and wealth and finance.

General Walker believed that a permanent establishment would prove to be in the highest degree economical, "in the sense of preventing errors and getting more for your money." "There are two kinds of economy; one of spending less money, and the other of getting more for your money, and the latter kind of economy can be practiced to a very high degree by a permanent bureau." "It is very much more important that the statistics should be sound when they do come out, than that their publication should be expedited a few months." He expressed his conviction that the head of the office and the chiefs of division and expert special agents need the opportunity for more careful reflection, in order to the perfection of the service, and that this is one of the most weighty arguments in favor of a change of system and method. He spoke of the "tailings" which might be extracted from statistical material which has already been once or twice worked over, which are of no special political, but would be of great statistical and sociological value. "When the next census is in preparation, two or three years should be allowed for the men to be getting their sheets up, or putting their heads together, looking over the results of past work, seeing where they have made mistakes, because no man ever worked without mak-

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ing mistakes, and there never was a man who would not do a certain work twenty or thirty per cent better the second time." The facts contained in the schedules "can be combined in almost infinite relations, and to statisticians and economists it is often true that the statistics which attract least popular interest are the most significant and instructive. A comparatively small trained force could work on that kind of material to an extent impossible where you have only half-trained clerks."

Mr. Wright said: "No man, I do not care how great he is, how great a statistician or how great an administrator, can take a census creditably to himself or to the Federal Government under the present system. It can not be done." Our regular army is small, but it is the skeleton of a great organization. It should be so with the census office. The constant bringing in of raw men for statistical work does more damage to statistical accuracy and to the science of statistics than any one element." He argued in favor of a biennial census of industries. As to the bill prepared by Mr. Porter, his chief objection to it was that "it makes a law for the taking of the Twelfth Census. I think there is too much detail in it to be enacted several years in advance."

Report of the House Committee.

The substance of the testimony elicited at this hearing, which lasted until the 20th of May, 1892, was embodied in the report of the committee, February 1, 1893 (H. R. Report No. 2393, Fifty-second Congress, Second Session). "Your committee is of the impression that the field of operation of the census office is so broad, and such a wide range of subjects are now embraced by the several branches of inquiry, that it is impossible to do them full justice with any organization possible under existing law. To accomplish the work now undertaken by the decennial census requires a force so large as to be unwieldy, and which it is impos-

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sible to form of proper material. Were the bureau so organized that its work would be continuous, the force required would be comparatively small, and competent statisticians and specialists could be secured for the service. It is also of opinion that the amount of money needed to carry on such a continuous bureau, distributing its work through the ten-year periods, would be materially less than the amount which would be necessary to take the census under the present system; and that, in addition, the work of collection and compilation of the returns would be more accurately and satisfactorily performed, and the results obtained would be of greater value." Together with its report the committee submitted a bill substantially identical with the Porter bill and recommended its passage.

The project of a permanent census office received no further attention in the Fifty-second Congress and none at all in the Fifty-third.

1896.

Special Report by Carroll D. Wright.

The discussion was revived in the Fifty-fourth Congress by the passage of a joint resolution, approved March 19, 1896, directing the Commissioner of Labor (then in charge of the Eleventh Census, Mr. Porter having resigned) to report to Congress for its consideration, as soon as practicable, a plan for a permanent census service.

In response to this resolution Mr. Wright submitted, December 7, 1896, a bill to provide for a permanent census service, with explanatory comments. (Senate Doc. No. 5, Fifty-fourth Congress, Second Session). It contained but twelve sections, and its aim was defined to be: "To provide simply for an organic administrative act, leaving the details of the Twelfth and subsequent censuses to the officers respectively having them in charge." It created a census office "at the seat of government," unconnected with

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any existing department, the reason given for this departure from established usage being that "any scientific office can conduct its work much more efficiently when the head of it is alone responsible therefor," and that "the scientific character of census work demands that it be carried on by an officer not subject to the political changes which come to the great departments." All appointments below the grade of assistant director were to be made in accordance with the provisions of the Civil Service Act. The sixth section of the bill defined the scope of the census. Provision was made for a quinquennial census of population, an annual account of agricultural products, a biennial account of representative manufacturing industries, an annual collection of the data of births and deaths obtained from the registration records of states and municipalities possessing such records, and an actual collection of such facts relating to the dependent, delinquent, and defective classes as can be obtained from public records only. The Director of the Census was ordered to submit estimates for a classified force of employes before October 1, 1897, and his suggestions and recommendations as to details necessary for taking the Twelfth and subsequent censuses in December, 1897.

1897.

Hearing by the Senate Committee.

January 9, 1892, the Senate Committee of the Census gave an informal hearing to Mr. Wright and Mr. S. N. D. North with reference to the measure proposed by the former. (Senate Doc. No. 68, Fifty-fourth Congress, Second Session.) Mr. Wright spoke upon the need of census legislation at that session, the desirability of a permanent census office, the reduction of the scope of census work, and the consequent reduction of expenses. He said that "the Superintendent of the Census is entitled to three years, at least, in which to prepare for the greatest single piece of work

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which our Government carries on," in order that he may "be able to see beforehand and arrange in his own mind the plans for the final tabulations and analysis, so that each step in the work of preparation forms part of a well-considered plan for the final completion of the work itself."

The Wright Bill.

The Wright bill was introduced in the House of Representatives, January 14, 1897, by Mr. Sayers (H. R. 9979), and in the Senate, January 18, by Senator Chandler (S. 3548). As introduced by Mr. Sayers (the Senate bill was not printed), it omits the sixth section, however, substituting therefor a provision that "the Twelfth Census shall be restricted to such specific topics as may be authorized by Congress."

Unsuccessful Attempt at Legislation.

On the 19th of January, Mr. Sayers introduced House Bill 10064, "To provide for the Twelfth and subsequent censuses," of the same general tenor as H. R. 9979, but devolving the work of taking the census upon the Commissioner of Labor. A very similar bill, with a few unimportant modifications, was introduced in the Senate, January 26, 1897, by Senator Chandler. (S. 3706).

All three of these bills are reproduced in the "Addendum" to Senate Document No. 68, above mentioned, where will also be found a copy of the inquiries made by the census enumerators at the Eleventh Census; a table showing the publications and the cost of each census of the United States; and the Memorial of the Committee of the American Economic Association and the American Statistical Association, praying the passage of legislation for the more effective organization of the census.

H. R. 10064 was reported by Mr. Bingham, from the Committee on appropriations to the House of Representatives, February 12, 1897, accompanied by a report (No.

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2909), which was ordered to be printed. The committee "deemed it wise to consolidate the work of the Department of Labor and the census." "The Department of Labor is admirably equipped for statistical work, having a trained and experienced force, which would constitute the nucleus of the enlarged census force. Efficient preparation, which in the long run means economy, would be entered upon at once. * * The work of the Department of Labor is germane to that of the Census Office, and there seems to be no reason why the two offices should not be consolidated, thereby saving expense in organization and administration, and avoiding the necessity of establishing another independent bureau."

Nothing further was accomplished, in the way of preparation for the census, by the Fifty-fourth Congress.

The Chandler Bill.

At the first session of the Fifty-fifth Congress, Senator Chandler introduced, March 16, 1897, a bill "to provide for the Twelfth and subsequent censuses" (S. 94), which was word for word, the same as the first Sayers bill (H. R. 9979), but with the ninth section omitted. (That section directed the Secretary of the Treasury to furnish the Census Office with temporary quarters in the Washington Post-Office building.) The office was to be "at the seat of government," and neither consolidated with the Department of Labor nor attached to the Department of the Interior. The Committee on the Census, to which the bill was referred, reported May 10, that a majority of its members were "of opinion that the employees in the Census Office should be appointed according to the direction [discretion] of the Director of the Census, and not in the method provided by the civil service law and the existing rules made in pursuance thereof." The Senate amended the bill in accordance with the recommendation. The debate over the measure ran through the months of December, January and

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February, and is reported in volume 31 of the Congressional Record, pages 24, 57, 159–171, 203–206, 312–319, 721–722, 756–757,—, and 1964–1977. It turned largely upon the method of making appointments, and upon the question whether the office should be an independent bureau or otherwise.

1898.

The Carter Bill.

In March, 1898, Senator Carter, Chairman of the Senate Committee on the Census, requested Mr. Porter, Mr. Wright and Mr. William A. King each to draft a bill for the taking of the Twelfth and subsequent censuses, which should embody in detail the necessary provisions in full. The comparison made between the proposed measures, and a thorough study of the questions involved, cleared the way for the introduction of a new bill (S. 4545) by Senator Carter, May 5, 1898, and on the 9th of May the consideration of S. 94 was indefinitely postponed. The debate on this bill in the Senate occupied portions of June 6, 7, and 8, and is reported in volume 31 of the Congressional Record, pages 5536–5563, 5593–5601, and 5633–5642. In advocating the passage of S. 94, Senator Carter had said that it contemplated another bill under which the permanent census work would be conducted, and that Congress reserved to itself the exclusive right to prescribe the scope of the census and the method by which it should be taken. In introducing S. 4545 as a substitute for S. 94, he said that the Senate was obviously determined to proceed directly to the consideration of the provisions requisite for the perfection of of a complete census law.

1899.

The Hopkins Bill.

In the House of Representatives Mr. Hopkins introduced, January 7, 1899, a bill "to provide for taking the Twelfth and subsequent censuses" (H. R. 11465). On the 16th of

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January he introduced a second bill (H. R. 11815) with the same title, differing in no very important particular from the first. The bill was accompanied by an explanatory report (No. 1871), from which the following extract is taken: "The Senate bill provides that there shall be established in the Department of the Interior a census office, the chief officer of which shall be denominated the Director of the Census. The substitute bill presented by your Committee provides for the establishment at the seat of government of a census office, providing its duties and making it a separate and independent bureau." It was briefly discussed and passed February 6. (See Congressional Record, vol. 32, page 1512.)

The Census Act, as Passed.

The Senate discussed the measure on the 13th and 14th of February (C. R. volume 32, pages 1788–1789 and 1848), and amended it by the substitution of its own bill passed at the second session. A conference committee was appointed, with the result that the Census Office was attached to the Department of the Interior, and the independent census was defeated, although the connection between the Census Office and that Department is, under the present act, more nominal than vital. The permanent census was also defeated by the inclusion of a proviso in the second section of the act "that nothing herein contained shall be construed to establish a census bureau permanent beyond the Twelfth Census."

Delayed Action Means Inaction.

The history of this movement, as here presented, indicates the substantial growth of opinion and sentiment in favor of a permanent census; but it proves that, after the completion of the decennial census, interest in the question on the part of Congress subsides; and that the delays incident to new legislation, even on this important subject, prevents the reorganization of the office until the last possible moment, when adequate time for preparation is not allowed.

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PART II.—VIEWS EXPRESSED BY THE ASSISTANT DIRECTOR AND CHIEF STATISTICIANS.

BY MR. WINES, ASSISTANT DIRECTOR OF THE CENSUS.

There is no reason to believe that the framers of the Federal Constitution, in providing for a decennial census, had in mind anything but the enumeration of the population of the United States, in order to secure a basis for equitable apportionment and representation. With the lapse of time, however, the census office has grown to be a governmental agency for the production of a periodical picture of the national resources and activities — not an exact picture in detail, like a photograph, but a rough sketch, broad in outline, yet possessing such verisimilitude as attaches to theatrical scene painting. It has been asked whether such an enlargement of the scope of the census is strictly constitutional. This question is irrelevant, since the right of the Government to collect information, statistical and other, which it may desire for its own benefit or that of the people, is unchallenged; and this right implies the correlative right to determine the method of procuring it.

Consolidation of Statistical Bureaus Impracticable.

In fact the Government maintains many scientific and statistical bureaus, and has organized the work of statistical inquiry, in some form and measure, in every department. It is unnecessary to inquire whether, and to what extent, duplication of work or an overlapping of fields of research may exist as between these departments and bureaus. It may or may not be true that, as some have contended, the consolidation of statistical work in a single office would be more efficient and economical. Such consolidation is impracticable, and if accomplished it might be found to be undesirable. The question of the division of work between existing agencies bears no necessary relation to the question whether the work committed by Congress to the Census

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Office would be better done by a temporary or a permanent organization.

Congress Determines the Scope of the Census.

The office is the creature and the servant of Congress, which alone has the authority to define its powers and duties, and their limitations. The office can exercise no powers not conferred upon it, and perform no duties not prescribed by law. The Director may ask for permission, or he may suggest that he be required to undertake certain inquiries; but the granting of his requests and the adoption of his recommendations rest wholly with Congress. There can be no clashing of authority, no conflict of jurisdiction between this office and any other within the Government, unless Congress itself lays a foundation for it; and it is absolutely within the power of Congress to prevent it. It follows that the relations between this and other offices will be settled from time to time by law as occasion may require, and as the dictates of policy, economy and utility may suggest.

Dismissing, therefore, these extraneous matters from consideration, and confining our attention to the real issue, let us seek light on that.

Work of the Census Office.

The work of the Census Office consists first, in the accumulation of information; second, in the proper treatment of the material collected.

Methods of Procuring Information.

There are three methods of procuring new and original information on such topics as Congress may prescribe, namely, by the employment of enumerators, as in the census proper, by sending special agents into the field, and by correspondence. The first two are essentially one and the

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same method, except that the enumerators are for the most part paid by the name or schedule, and field agents by the day. The latter are also allowed and paid their actual traveling expenses, while the former are not. In census taking the three methods are combined. Additional supplementary and illustrative information is gleaned from printed sources, but it is not new. The collation and comparison of the scattered results of other men's labors is, however, an essential element in the advancement of science, natural or social, and adds to the value of the census, if not carried to an extreme.

Necessity for a Separation of Topics.

Any reform in census methods, therefore, must begin with a division of the topics on which reports are desired. The first should include those topics concerning which information can not be secured, or not so well secured, without the aid of the enumerators in a house-to-house canvass, such as is required for counting the population. All other topics fall into the second group. The inquiries relating to the second group need not be made in the census year, and replies to the questions asked can be secured, in many instances, by simple correspondence; but if not, then by the employment of special agents in the field.

A Permanent Census the Logical Sequence.

It is precisely this reform which Congress has initiated in the present Census Act, by ordering the preparation and publication of the four principal census reports (on population, agriculture, mechanical industries, and mortality) by the 1st of July, 1902, and directing that certain other lines of special research, heretofore devolving upon the Census Office, shall be prosecuted thereafter. A permanent census office, though not established by this act, is the logical and practically inevitable outcome of the action taken by the Fifty-fifth Congress.

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Retention of Trained Office Force Desirable.

The conversion of this office into a permanent bureau would favor the retention of the most capable and efficient members of the force as a skeleton organization and a nucleus for future operations. Under the system, or lack of system which has prevailed hitherto, the entire force is disbanded and scattered once in every ten years, and can never be brought together again. Each new census is taken by new men who are for the most part devoid of the special experience and training which is peculiarly important in statistical work. Mr. Horace Wadlin, Chief of the Massachusetts Bureau of Labor Statistics, has well said that "only a permanent bureau can possibly insure a trained force of expert statisticians."[1] In the hearing before the Select Committee on the Eleventh Census of the House of Representatives in March, 1892, Mr. Frank R. Williams, expert special agent for the division of manufactures, testified: "In my division up to the 1st of January (1892), I have had a total of over six hundred employees. Out of that number, after trying for weeks in some cases and months in others, to educate them up to the standard required for this work, only about one hundred and fifty clerks were found competent, while as to the others their employment was practically wasted so far as the labors of the manufactures division were concerned. I found them, if not wholly incompetent, at least not adapted to that character of work."[2] The training of clerks costs money, and the money expended upon those who, in spite of the efforts bestowed upon them, prove in the end incapable of giving satisfaction, is a total loss. They are a drag upon the efficiency of the office, and not merely do they accomplish less than they should, but much irritation is occasioned and time lost in the correction of the errors which they

[1] 52d Congress, 1st Session, Senate Ex. Doc. No. 1, page 60.
[2] 52d Congress, 2d Session, H. R. Report No. 2393, page 99.

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make. They lower the standard of efficiency in every branch of the work. But a thoroughly trained and competent force can be secured by the present method of appointment. Such a force is the product of a process of natural selection continued for a series of years.

Continuity of Office Traditions.

The periodical discontinuance of the office occasions an interruption in what Prof. Roland P. Falkner, of the University of Pennsylvania, calls "its traditions." He observes: "A great mass of practical decisions on disputed points must continually be made in statistical work which can not be reduced to forms and regulations, and whose preservation in the memory of those engaged in the work is very essential. This is of quite as much importance as the retention of the same persons in the work."[1]

Continuity of Office Records.

It also interrupts the continuity of the records of the office. Mr. Williams, above quoted, estimated the cost of preparation of the list of manufacturing establishments in the United States, required at each census, at $25,000.[2] A much smaller expenditure would admit of keeping up this list, on the card system, from one census to another, by making the necessary corrections from time to time, and it would then be ready when wanted, instead of having to be prepared anew. This remark applies to all similar lists in use, of which there are many. Mr. Williams also pointed out that "the changed methods" adopted by succeeding superintendents of census, especially from 1810 to 1870, render satisfactory comparisons of the statistics of manufactures impracticable. "Under a permanent bureau," he remarks, "the tendency to change methods will be greatly lessened, and the results bear a corresponding increase of value."[3]

[1] 52d Congress, 1st Session, Senate Ex. Doc. No. 1, page 73.
[2] 52d Congress, 2d Session, H. R. Report No. 2393, page 84.
[3] Ibid., page 86.

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The Census Library.

One of the most valuable auxiliaries to a properly organized statistical office is its library. On this subject Dr. August Meitzen, of Berlin, author of an important work on the History, Theory, and Technique of Statistics, wrote to Mr. Porter: "A library is necessary for such a bureau which shall contain the statistical publications of the United States and foreign countries — a collection as complete as possible. It should establish an exchange of such works with other countries." In the United States, and for the work of this office, such a library should be a depository for every state and municipal document referring to any subject of inquiry in the census. Especially valuable are documents and pamphlets relating to municipal government, finance and the work of public and private charitable and correctional institutions. The value of the collection depends upon its continuity and completeness. A library was started in the Eleventh Census, but when the office was closed, the books were more or less scattered, and in consequence of its discontinuance no effort was made to procure the serial or annual numbers of certain reports and publications, the want of which will hereafter be seriously felt.

Geographical Work of the Office.

Another branch of the work in which there should be no interruption relates to the political geography of the country. Great inconvenience and much loss of time is experienced at each decennial census on account of the lack of information respecting the boundaries of minor political civil divisions and the change in them. The Census Office should possess a complete file of the best and latest maps of states, counties and towns in this country. It is upon the geographical division that reliance must be placed for advance estimates of population, based on the popular vote at general and local elections, etc.

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Time Required to Prepare for Taking the Census.

In all these and in other similar ways the work of the office suffers loss by its temporary discontinuance. These evils are most keenly felt when the time arrives for its resumption. All authorities on the subject agree that the excellence and value of statistical work depends upon the thorough preparation of the forms of inquiry and the organization of the best practical methods of securing full and truthful replies to the questions asked. Adequate preparation for a task of such magnitude demands more time than Congress has ever yet allowed for it. In the judgment of Mr. Carroll D. Wright, three full years is none too much. But the bill introduced by Mr. Garfield for taking the Ninth Census did not pass the House until April 6, 1869, and was defeated in the Senate. Its consideration and the uncertainty as to its passage delayed the preparation for the census of 1870 until after it had been disposed of. The bill for taking the Tenth Census became a law March 3, 1879. The bill for taking the Eleventh Census became a law March 1, 1889; but by a subsequent act, approved February 22, 1890, barely three months before the enumeration, Congress ordered additional questions to be inserted in the population schedules which occasioned delay in printing them, and this action greatly hindered and embarrassed the superintendent, Mr. Porter, at the outset of the inquiry.[1] The bill for taking the Twelfth Census became a law March 3, 1899. It will be noticed that in no instance has Congress allowed more than fifteen months for the preparatory work, which includes the renting and equipping of suitable quarters, the creation of an office force of 3,000 clerks, the formulation of the various inquiries, the printing and distribution of tons of schedules and other blanks, the division of the entire territory of the United States into enumeration districts, and

[1] See testimony of Carroll D. Wright, 54th Congress, 2d Session, Senate Ex. Doc. No. 68, pages 4, 5.

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the selection and instruction of 300 supervisors and 50,000 enumerators. Every Superintendent of Census, beginning with General Walker, has complained of the injustice, as well as the impolicy, of imposing such a burden upon any officer of the Government. More time is needed in which to consider the use that is to be made of the material when collected, and the steps necessary in order to handle it economically and present the results in the best possible form. In view of the evident impossibility of early legislation with regard to the decennial census, the only way in which proper preparation for taking it can be insured, is to make the office permanent.

A Permanent Census Office an Economy.

It has repeatedly been said that a permanent census office would be an economy, and this is true. It may be questioned whether placing the office on a permanent basis would have the effect to decrease the total expenditure during the decennial period. It might very well happen, on the contrary, that Congress would deem it expedient to require of the office a larger amount of statistical work in the aggregate, involving a total larger outlay. But there can be no question that the results obtained would be more nearly commensurate with their cost, or in other words, that the Government would receive greater value for every dollar actually expended, and that the decennial census proper would cost less than it costs under the present system. Its scope, which is not now so large as it was in 1880 and 1890, could be still further restricted. There would be a saving of the waste due, under the present system, to the disorganization and reorganization of the office, to the want of proper and timely preparation for the enumeration, to the haste with which the selection of supervisors and enumerators has to be made, to the lack of time for properly instructing them in their duties, to the absence of thorough study

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and elaboration of the census schedules, and to the necessity for the sudden selection of so large an office force, composed, for the most part, of untrained and untried men, many of whom are incompetent to discharge the duties incident to planning, supervising, and directing the work.

The sale of the furniture and fixtures of the office, valued at $150,000, at secondhand, once in ten years, is in itself no inconsiderable source of pecuniary waste.

No Time Allowed for Review.

One of the evils of the present system is that no opportunity is afforded for retrospective work. The criticism of census publications is all from the outside, and is usually severe in proportion to the delay in their appearance. What would be of far greater value is self-criticism, a deliberate review of the work, by the statistical experts employed in the office, in order to determine wherein it is defective or unprofitable, and how it can be improved, if attempted again.

Scientific and Sociological Work of the Census.

There is, besides, always a residuum of work undone, in the haste of publication, which would have been worth doing, and can still be done, if the office is not broken up. Mr. Carroll D. Wright's testimony as to this point is as follows: "There are many facts that have been collected in the present and in past censuses, that have not and can not be tabulated, but which should be tabulated. The statistics of unemployed labor in the United States were collected in 1880, but not tabulated. The information appears in the schedule. I doubt if it will be tabulated this time. All the facts relating to conjugal condition, the nativities of married and single, etc., were not tabulated in 1880. The information all lies there, and could be tabulated, and would be just as valuable now as then."[1] What he said of the

[1] 52d Congress, 2d Session, H. R. Report No. 2393, page 88.

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Tenth Census is equally true of every census. Three principle uses are made of the material collected, namely, political, economic, and sociological. They are here named in the order of their vital and immediate interest. The primary and constitutional purpose of the census is to afford the necessary basis for the appointment of political representation. It fulfills a subordinate, but important function, in the collection of exact, fresh, and recent information as to the fluctuations in the material and economic conditions which affect agriculture, manufactures, and commerce. This information, which is demanded by the business interests, is also of value in its relation to taxation, and as a guide to intelligent and effective legislation on social and economic problems. These are the two most pressing, urgent demands upon the office, and its credit with the people depends upon the promptness with which they are met. But, in the interest of science, the further demand is made that the facts collected shall be compelled to yield whatever they contain which may contribute to our knowledge of the constitution, organization, and social activities and relations of society as a whole, and of the various elements of which it is composed. This is a branch of the investigation which needs to be more deliberate, and which requires the arrangement of data in a multitude of relations more or less tentative. In a word, the Census Office should be a sociological laboratory, in which statistical material is exhaustively analyzed and properly classified, and conclusions are carefully weighed and tested before they are announced. This strictly sociological work might very well be postponed until the reports for political and financial consumption are out of the way.

Work Not Done.

By the way of illustration of the point just made, extracts from some of the letters addressed to Mr. Porter in 1891 may here be quoted.

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Mr. H. S. Pritchett, formerly at the head of the United States Coast Survey, and now President of the Massachusetts Institute of Technology, writes: "Our statistics of population would be immensely more valuable, if we knew the fluctuations of value from decade to decade. This knowledge could be gathered by a permanent census bureau, and only in this way can the accuracy of the statistical work be checked, and the elements of the population be classified. A striking illustration of the value of such work is found in the use which the English Government has made, in the recent Bering Sea controversy, of the results of compilations by the English Census Office. * * The organization maintained by many of the European States for collecting constant official records of the fluctuations of population could be studied with advantage."[1]

Mr. Edward Atkinson writes: "To my mind the most necessary department yet remaining to be set at work to its full measure of usefulness is a *Department of Relative Statistics*, by which the relative conditions of the different states of this Union, and of this Union as compared to other countries, may be shown. * * I should expect one of the first developments of a permanent census bureau to be the establishment of a science of the comparative statistics of nations, than which nothing could be more important as a basis for intelligent legislation."[2] Mr. Atkinson, in the letter quoted, employs the felicitous phrase, "natural history of industry," to express a result which he thinks a permanent census office might attain, by intelligent and persistent study of the progressive diminution of profits and increase of wages, with the progress of invention, in every specific mechanical art of considerable importance.

Dr. William T. Harris, United States Commissioner of Education, writes: "The census, with its limited period of

[1] 52d Congress, 1st Session, Senate Ex. Doc. No. 1, page 82.
[2] Ibid., page 68.

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action, has never been able to collect a most valuable kind of material, regarding the social development in cities, and with regard to the bulk of wealth in the whole country. There are political and social questions which affect politics and legislation — the Henry George question, for example; the Bellamy socialism, as another example. All these rest upon a supposed law which Karl Marx announced many years ago, when he was still living in England, namely, that the rich are growing richer and the poor are growing poorer, and the middle class is disappearing among the poor. On the strength of this law he arraigned our industrial civilization. The actual statistics kept in England by means of the income tax show that the contrary law is in action there, namely, that the middle class is ascending rapidly into the rich class, and the poor class is ascending with equal rapidity into the middle class. Such statistics in the United States would be of immense value to all our statesmen and politicians. But it is evident that the census bureau, with the limited means at its disposal and its short term of existence, can not obtain such important facts, nor can it train the specialists who can handle such questions." [1]

Mr. B. C. Keeler, of St. Louis, writes: "Tons and tons of reports have been printed showing the production of wealth in this country, but next to nothing to show its distribution." [2]

Mr. Thomas G. Shearman, of New York, writes: "The census of 1880 produced an enormous mass of statistics relating to manufactures, which have ever since been practically useless to students of the subject without a large number of difficult and time-consuming calculations which ought to have been made by the bureau itself. * * To be more specific, the tables of wages, cost of materials, etc., are practically useless without supplementary calculations. * *

[1] 52d Congress, 1st Session, Senate Ex. Doc. No. 1, page 77.
[2] Ibid., page 76.

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Many such calculations have been made, but they are all prepared by private individuals. * * It should all have been done for them by the census bureau, once for all." [1]

Mr. Wright, in his testimony, January 9, 1897, referred to the well-known fact that "the lines of criminal statistics vary as the condition of industry varies," and said that a permanent census "would enable us to reach some kind of a conclusion as to the effect which industrial depression has upon crime."

The Smithsonian Institution: An Illustration.

Illustrations of this general character might be indefinitely multiplied and brought down to date. The field of scientific investigation, from a sociological view, is practically limitless. It includes not only the composition of the social whole, and its internal relations (marriage, divorce, births, deaths, occupation and employment, etc., by elements of the population, sex, age, and the like), but the relations of man and nature; for example, his relation to the soil (farm tenure, the ownership of land, taxation, etc.), to different forms of productive labor, etc., etc. A decennial census takes too disproportionate a survey of static relations; for the proper study of dynamic social relations, more frequent observations are essential. The growth of the nation can not be thoroughly understood unless it is studied analytically, element by element, by men who give their lives to its consideration. There are, too, numberless obscure but vital interrelations between facts gathered in different fields of inquiry which, to a casual observer, seem disconnected. Sufficient attention has not been given to their coördination. The advance of the physical sciences during the past century has been greatly stimulated and promoted by the work of the Smithsonian Institution. A permanent census office, if organized on somewhat the same general lines, with equal

[1] 52d Congress, 1st Session, Senate Ex. Doc. No. 1, pages 77-78.

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freedom to select subjects for original research, to adopt methods of investigation and to call to its aid the highest talent and the best thought in the United States, regardless of its official connection with the Government, might render signal service in the development, during the next hundred years, of the social sciences. This is the true ideal of permanent census work. The census office should, in point of elevation of standards and the intellectual power of those responsible for its direction, rank with the first universities of Europe or America.

Centralization of Statistical Work.

Prof. Richmond Mayo-Smith, of Columbia University, in an article printed in the *Political Science Quarterly*, Volume XI, No. 4, has discussed the question of "centralization" or "decentralization" of statistical work. Under our political system, with its wide distribution of jurisdiction among states, counties, cities, and towns, and with the vast private initiative which characterizes American life, the data upon whose collection and incorporation into one homogeneous whole all sound statistical generalization and scientific deduction depends, are so fragmentary and scattered, that the need of centralization of statistical inquiry is sorely felt. Such centralization can only be effected by the National Government, and the Government itself is powerless to accomplish this result without the intervention of a central bureau, thoroughly scientific in its character and methods. The census office could be made such a bureau. Professor Seligman, of Columbia University, has even said that "it is the opinion of all economists that we can not hope for thoroughly trustworthy and really useful statistics in this country until we have a permanent bureau."[1] One reason for this belief is indicated by Mr. F. B. Sanborn, of Concord, Mass., who says: "We have as yet no bureaus

[1] 52d Congress, 1st Session, Senate Ex. Doc. No. 1, page 80.

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which require the local officials to keep records of statistical exactness. * * What is needed most is to teach the myriads of persons who, from different parts of the country, report the existing facts, that records must be carefully kept and statements exactly made. Experience has shown me that the best school for such accuracy, among the original collectors of information, is the existence and persistent requirement of periodical returns, occurring so frequently that the errors and merits of each successive return can be readily shown to the persons who take them, without exciting too much resentment, despair or confusion in the minds of such persons. * * I should look to a permanent census bureau as one step toward supplying this defect of exact knowledge to these eager persons who have no defect of the generalizing faculty, except knowing how and where to apply it."[1]

In addition to what Mr. Sanborn has said, emphasis should be laid on the importance of uniform methods, without which statistical returns collected from different sources at different times can not be consolidated and compared. This end could be promoted by maintaining intimate and uninterrupted relations between a centralized bureau and the various private and public organizations from which it gathers information. But such relations are impossible, unless the central bureau is permanent.

The Philippine Census.

The suggestion need scarcely be made that, in 1910, if not at an earlier date, a census will have to be taken of the Philippine Islands, for which special preparation will be necessary, and this preparation, in order to be thorough and effective, will require a much longer period than Congress is accustomed to allow for this purpose.

[1] 52d Congress, 1st Session, Senate Ex. Doc. No. 1, page 81.

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BY MR. WILLCOX, CHIEF STATISTICIAN FOR METHODS AND RESULTS.

The century just closing has been recently called by Sir Robert Giffen "the statistical century *par excellence*," and rightly so, for almost the entire development of statistics has occurred within the nineteenth century. In 1800 no country possessed organized statistics in agriculture, manufactures, or vital statistics, and no country except the United States had made provision for a periodic count of its population. By 1900 nearly all the great civilized countries had made provision for recurrent investigations into these sides of national life and activity, and in this striking development the United States have taken a conspicuous and honorable part. The rise and growth of census work, in all civilized countries, during the nineteenth century, warrant the belief that the growth should and would continue. It has been attended in the past, and doubtless will be attended in the future, by the development of statistical bureaus, offices, or departments requiring a body of men trained to administer or superintend their details. In response to this need, a body of expert or professional statisticians has sprung up, whose services to the Government increase in value with their growing experience.

Congress recognizes this class of experts and their value to the Government, by requiring, in the present census law, that the Assistant Director "shall be an experienced, practical statistician," and that the five chief statisticians "shall be persons of known and tried experience in statistical work." If the persons secured to fill these places regularly lose their positions when their maximum efficiency is reached, Congress will be unable to secure the full benefit of the experience demanded by these provisions of the law. To support this conclusion, appeal may be made to the history of American census work during the last half century.

In 1850 Mr. Kennedy was made superintending clerk of the census. He was succeeded in 1853 by Mr. De Bow,

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who finally retired in 1855. In 1858 Mr. Kennedy was again appointed to prepare a digest of manufactures for the Seventh Census, and from 1860 to 1865 he was superintending clerk of the Eighth Census. In 1870 Mr. Walker was appointed superintending clerk of the Ninth Census. After holding the position for twenty-one months, he was for fourteen months Commissioner of Indian Affairs, and then accepted a position in Yale University. But for seven years he continued, without salary, to direct the work of the Ninth Census, so far as compatible with his other duties. In 1879, he was appointed Superintendent of the Tenth Census, retiring in a little more than two years. Then Mr. Seaton was appointed, and held the office for three years. In 1889, Mr. Porter was made Superintendent of Census and served for four years; then Mr. Wright was appointed, and served for four years, completing the work of the Eleventh Census. The six persons who were at the head of United States census work between 1850 and 1899 served on an average five and two-third years; or, if one disregards the seven years when Mr. Walker was in private life and away from Washington, but still retained some connection with the office, then they served on an average four and one-half years.

What has been true of the heads of the Census Office, has been true of the leading subordinates. The present law requires that six of the Director's subordinates should be experienced statisticians, but men of the necessary caliber can not always be persuaded to accept temporary positions at the salary provided by Congress. Two of the six positions had to be filled by persons who retained their hold at the same time upon permanent positions, and who are likely to withdraw, just as their experience becomes most ripe. Of the five chiefs of division (the immediate subordinates of the chief statisticians) two resigned in less than two years after their appointment to accept permanent positions else-

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where; the other important officers, out of loyalty to the work, and after some pressure, have declined invitations to better themselves through resignation. Such frequent changes in the high officials give a feeling of restlessness and uncertainty to the whole office, and injure its efficiency. In an office charged with expending Government funds to the extent of $1,500,000 a year on an average, and $9,000,000 a year as a maximum, it seems extravagant and wasteful deliberately to throw away the experience of the directing heads after the Government has bought and paid dearly for it.

To learn whether other countries, in filling similar positions, appreciate that need of experience which Congress emphasized in the present census law, I have selected the seven statisticians, in as many foreign countries, who have been most conspicuously identified with census work during the last half century, and have examined their tenure of office. The names selected were: In Austria, Karl Theodor von Inama-Sternegg; in England and Wales, William Farr; in the German Empire, Karl Becker; in Hungary, Karl Keleti; in Italy, Luigi Bodio; in Prussia, Ernst Engel; and in Russia, Nicholas Troinitsky. The information regarding France I could not find.

Of these seven men, four have died; the other three are still in office. None of them has served for a shorter time than sixteen years, and William Farr held an important statistical position for forty-two years. The average length of these men's connection with census and other statistical work, in their respective countries, has been twenty-four years, or many times as long as the average tenure among high officials in the American census office.

The history and present condition of the United States Census Office show that, where the tenure of the high officials is brief and uncertain, the office is debarred from utilizing properly its own accumulated experience — an ex-

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perience that, with the growing complexity of the work, becomes steadily more necessary; and this lesson from our own history is supported by the uniform experience of other great countries.

In pushing to completion the inquiries provided for in section 7 of the census law, the office has its own field agents, and through them comes into direct contact with the people. But when it reaches the inquiries provided for in section 8, it can no longer rely upon the enumerators, and in many subjects must seek the co-operation of various state, county, city, or private organizations. For example, in collecting statistics relating to "the insane, feeble-minded, deaf, dumb and blind," the office must lean heavily upon the state commissioners of lunacy. In collecting statistics upon "crime, pauperism, and benevolence, including prisoners, paupers, juvenile delinquents and inmates of benevolent and reformatory institutions," it must lean upon the state judicial authorities, state prison commissioners, and state commissioners of charities. In reporting upon "deaths and births in registration areas," it must enlist the co-operation of the various state boards of health and registration offices. In reporting upon the "social statistics of cities," it must seek co-operation with a great number of municipal officers. In reporting upon "public indebtedness, valuation, taxation, and expenditures," it must ask help of state, county, and city financial officers. In reporting upon "religious bodies," it must depend upon the diverse religious organizations.

In all these fields of action, the Census Office has, and can have, no authority conferred upon it by law. The co-operation of state, county, or city offices, or of private organizations, must be voluntary, and it can be secured only by building up cordial relations with them, and proving to their satisfaction that the benefits they will receive from the work of the Census Office will compensate them for the labor of correspondence, and of making reports in

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the form and to the extent requested. That such co-operation between a national office and state municipal officers may be developed is proved by the relation of the United States Department of Agriculture to the various state departments of agriculture; of the Bureau of Education to the various state educational systems; of the United States Geological Survey to the various state geological surveys; of the United States Weather Bureau to the various state weather bureaus; of the National Department of Labor to the various state bureaus of labor, or similar offices; of the Commission of Fish and Fisheries to the various state fish commissions. Other instances might be cited.

Effective co-operation of this sort depends upon securing in the central office a thorough knowledge of the conditions under which the various state or local offices are working, of the difficulties they have to encounter, and of what it would be reasonable to ask of them. It depends also upon fostering in these various local offices a readiness to co-operate, and a recognition of the fact that the Census Office desires only to subserve their interests and extend their influence. For the proper development of the inquiries provided for in section 8 (and it may be noted that other inquiries of a similar character may frequently be ordered by Congress), the organization of the census bureau on a more permanent basis seems to me indispensable.

The main public reasons, then, for desiring a permanent census office are, in my judgment, these two:

(1) Only through a permanent office can the Government and the country profit adequately by the experience of the organizing and directing heads.

(2) Only through a permanent census office can the necessary system of voluntary co-operation with state, county, and city offices and private organizations be developed and maintained.

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BY MR. HUNT, CHIEF STATISTICIAN FOR POPULATION.

The act governing the taking of the Twelfth Census stipulated that the work at the decennial period of enumeration should be restricted to inquiries relating to four subjects only, namely, population, agriculture, manufactures, and vital statistics, but authorized the collection at a later period of statistics pertaining to certain special subjects of census investigation. This division of the census work was the result of the experiences of the Tenth and Eleventh censuses, at which the completion of many of the volumes of the census reports was much delayed, owing (1) to the inability of the office, from the administrative standpoint principally, to handle so many different kinds of work at one time; (2) to the difficulty in securing the necessary clerical force and building space of the right kind for the prosecution of fifteen or twenty distinct investigations when, as a necessary requirement of the work, a maximum force is needed in each case at practically the same time, if the reports resulting therefrom are to be made ready for printing without material delay; (3) the inevitable block in the printing office all along the line, from the very beginning of the work relating to the different inquiries to the completion of the several reports themselves; all of which helped to produce conditions which resulted in unavoidable delays in the prosecution of the different branches of the work and prevented the completion of the census volumes within a reasonable length of time.

So far as the general decennial work of the Twelfth Census is concerned, this division over the ten-year period of what has come to be considered as legitimate census work did not lessen, as a matter of fact, the amount of preparatory work necessary to the enumeration of the population and the prompt tabulation of the enumerators' returns, in order that the count of population for apportionment purposes might be made ready for the use of Congress at the

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beginning of the session in December immediately following the date of enumeration. This statement is equally true with respect to the work carried on in the manufactures and agricultural divisions, and, to a very considerable extent, to that in the division of vital statistics. It did, however, enable the office to concentrate its energies in the prosecution of these four branches of census work only, and to that extent is a very great improvement over the condition of affairs at the last two censuses preceding.

In addition to the enumeration of the population of the states and organized territories of the United States proper, specific provision was made by the Census Act for the enumeration of the population of the Alaska and Hawaii, and, by implication, also of the population of the Indian Territory and Indian reservations, areas not heretofore comprehended by the work of the general census enumerators. In the prosecution of the work relating to population thus laid down by the Census Act, the force under my direction was busily employed for something more than a year, dating from my appointment on March 25, 1899, in making, or assisting in making, necessary preparations for the enumeration to be carried on during the month of June, 1900. This preparatory work comprehended (1) the division of the territory to be canvassed into 300 supervisors' districts and their subdivision into more than 50,000 enumeration districts; (2) the preparation of the schedules, blanks, and miscellaneous supplies needed by the supervisors and general census enumerators in their work, including a practical test of the applicants for appointment as census enumerators; (3) the enumeration of the population of the larger institutions of the country by the appointment of special "institution" enumerators; (4) the enumeration of the population of the military and naval stations at home and abroad through the agencies of the War and Navy Departments; (5) the enumeration of the population of the Indian Territory and of the

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Indian reservations in co-operation with the Commissioner of Indian Affairs; (6) the provision for a much closer supervision than heretofore of the enumeration of the population of the larger cities of the country, by the employment of special agents to assist the supervisors in the cities and by the use of the streetbook, individual census slips and "absent family" schedules to supplement the ordinary work of enumeration; and (7) the shipment of schedules and supplies to the supervisors and enumerators.

Concurrent with these preparations relating to the enumeration work, the preliminary steps had to be taken to provide for the organization, equipment, and instruction of the large force of employees to be used in receiving, examining, and compiling the enumerators' returns, and, as a necessary adjunct thereto, in the certification of the enumerators' accounts for settlement by the disbursing office. This preliminary work comprehended (1) an examination of the records of the Eleventh Census, so far as they were available, for the purpose of obtaining a basis for estimating the time in which the work of the present census could be completed and the approximate number of people that would be needed for its prosecution; (2) the testing of the several tabulating devices submitted in accordance with the requirements of the Census Act, and, upon the acceptance of the Hollerith system of electric tabulation, in providing for securing the necessary number of individual and family punch cards printed in accordance with the classifications required for the work, wooden boxes properly equipped for storing the cards, keyboard punching machines, schedule holders, gang punches, and electrical tabulating machines; (3) the equipment of the space in the Census Office building set apart for the population work, in the way of providing proper shelving for the cards and schedules, in dividing the rooms into sections and subsections for the proper conduct of the work, in the letting of the contracts

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for the building of the tables, chairs, and other necessary furniture for the use of the clerks, and in providing for the proper disposal of the outer clothing of the large force of employees; and (4) in the preparation of the instructions, result slips, and other blanks needed in the several branches of the population work.

It is easy to thus briefly summarize the preparatory and preliminary work incident to the enumeration of population and the tabulation of the completed returns, but it is difficult, without great elaboration, to indicate the amount of labor involved and of energy expended in a comparatively limited period, in order that the enumerators should be fully equipped to begin their work promptly on the morning of the 1st of June, 1900, and to have a sufficient force of employees in readiness to handle the completed schedules as soon as received. Some idea of the comprehensiveness of this work can be gathered, perhaps, from a brief statement of the number and gross amount of schedules and other blanks printed for the use of supervisors and enumerators, a work which was largely carried on under my direction, although comprehending, to a greater or less extent, the work of other divisions of the office.

For the purpose of obtaining the information relating to population, agriculture, manufactures, and mortality, as required by the Census Act, it was necessary to prepare and print upward of 60 different schedules (or forms of schedules), representing in the aggregate over 12,000,000 copies; that is to say, besides the 4 general schedules, of which in the aggregate 10,400,000 copies were printed, there were 41 special schedules relating to the different manufacturing industries, 9 special schedules relating to the different branches of agriculture, and separate special schedules for the enumeration of the Indian population, of persons in the military and naval service of the United States at home and abroad, of persons defective in sight,

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hearing, and speech, of inmates of penal and reformatory institutions, and of live stock not on farms and ranges, these special forms of schedules representing an aggregate of more than 1,500,000 copies. In addition to the 60 general and special forms of schedules used in whole or in part by the census enumerators, something like 125 different blanks and forms had to be prepared, and of these more than 15,000,000 copies had to be printed, for use in connection with the work of enumeration. This means, therefore, that it was necessary to print for the purposes of the general enumeration upward of 26,000,000 copies of schedules and blanks; and, besides these, a complete set of schedules and blanks was needed in each case for the enumeration of the population of Alaska and of Hawaii, amounting in the aggregate to more than 50,000 copies for each, which were prepared, printed, and shipped in May and October, respectively, of the year 1899, in order that the work in these two territories could be carried on as nearly simultaneously as possible with the work of enumeration in the United States proper.

The schedules and blanks used by the census enumerators were not shipped in bulk to the supervisors, as was the case at the Eleventh Census, but a sufficient number of the several schedules and blanks was enclosed in a separate portfolio for each enumeration district, and these portfolios, of which there were more than 50,000, were forwarded to the supervisors, in large wooden boxes, to the number of approximately 4,500, for distribution by them to the enumerators of their respective districts. This involved a great amount of labor and required a comparatively large force of employees, but it simplified very greatly the work of the supervisors who, usually speaking, do not have the proper facilities nor a sufficient number of clerical assistants to handle a great mass of schedules and other blanks and make the necessary separations for the use of individual enumerators, requiring

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different numbers of schedules and blanks according to the character of their respective districts.

Similarly, in preparing for the work to be carried on by the large force of employees in the compilation of the population returns and the proper accommodations thereof, it was necessary to provide for the purchase and printing of about 90,000,000 individual cards and 18,000,000 family cards; for the making of 68,000 boxes for storing the cards; for the purchase of 575 new keyboard punching machines and the repairing of 645 old keyboard and gang punching machines; for the making of 1,100 schedule holders; for the employment, under contract, of something like 150 tabulating machines; and for the purchase of 2,500 chairs of special pattern and of 462 large tables, accommodating, in each case, two or three persons, for use in the several subsections of the punching and other machine work.

In the early stages of the preparatory work a limited force only was needed, but as this work progressed the force was increased from time to time, so that in the middle of May, 1900, there was upward of 160 persons engaged under my direction in the preparatory work incident to the enumeration. In accordance with my estimate of April 3, 1900, provision had been made, however, for the assignment of a certain number of active, energetic, and intelligent young men daily, beginning with May 16, and the assignment of a certain number of women daily, beginning June 1, 1900, in order that they might become somewhat familiar with the work before the receipt of the enumerators' returns, when their services would be required in the work of actual tabulation, or work incident thereto. This estimate, representing the employment of something more than 1,800 clerks for a period of about six months following the close of the enumeration on June 30, 1900, was based upon estimates derived from the experience of the Eleventh Census, this large force being required in the early stages of the

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work of tabulation in order to provide the number of people needed primarily in receiving, examining, freeing, and delivering the schedules to the several divisions charged with their compilation, in checking and certifying for payment more than 53,000 enumerators' accounts, and in carrying on all the various processes of the population work necessary to the completion of the count of population for apportionment purposes prior to the assembling of Congress in December. Beginning with the middle of May, a force of 300 men was taken on at the rate of 10 daily, and the remainder of the force, comprising mainly women, was taken on at the rate of about 40 a day from June 1 until July 25, when the total force of the division numbered 1,807 people; but this number was subsequently increased by the exigencies of the work to a maximum of 1,960 on October 10, 1900.

The legislation providing for the work of the Twelfth Census was not effected until March 3, 1899, or not much more than a year prior to the date set for the enumeration, that is, no greater length of time than was permitted for the work in connection with the Tenth and Eleventh censuses. It is apparent from the foregoing synopsis of the work relating to population at the present census that a year is not a sufficient length of time in which to make proper and adequate preparation for the enumeration and, at the same time, for the organization and equipment of the large force needed for the execution of the work of tabulation. It is manifestly true also that, in spite of the anticipatory employment of a good share of the force in order that they might become more or less familiar with their duties before the actual work of tabulation commenced, a force of very nearly 2,000 persons can not be trained sufficiently in so short a time to do the work required with accuracy and precision, and this is more apparent when it is considered that the number of experienced persons available for the work of supervision and instruction is necessarily limited under the

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existing conditions of the census organization. Of the 1,960 persons who were employed in the population division, October 10, 1900, only 119, or barely 6 per cent, had been identified with the work of the Eleventh Census, and of this small number less than 20, or barely one-fifth, had previously had sufficient training in census work to have their services utilized in a supervisory capacity. The paucity of available material for the work of supervision under our temporary census organization is more fully emphasized when it is considered that the small number of experienced persons who could be utilized in supervising the work of my force represented less than 14 per cent of the total number of persons required in the work of supervision when the force as a whole numbered 1,960 persons. In spite of these conditions, however, the work accomplished by a practically untried force, numbering very nearly 2,000 persons, is worthy of mention, and in this connection I can do no better than to repeat what I said to the Director in my letter of March 21, 1900, touching the efficiency of the Twelfth Census force, which had been employed under my direction.

The amount of work accomplished by this force under such conditions of organization may be briefly summarized. The first returns from the census enumerators were received on June 13, and a few days later the work of examining the schedules was begun for the twofold purpose of verifying the statements made on the enumerators' pay vouchers, so that they could be passed forward for settlement without unnecessary delay, and of preparing the population returns so that the work of punching a card for each person enumerated and the subsequent tabulation thereof on the electrical machines could be pushed to completion at the very earliest date possible. The examination of the schedules, so far as it affected the settlement of the enumerators' accounts (exclusive of the returns for Alaska and Hawaii and for the military and naval population), was substantially completed on August 31, when 45,300 out of a total of 53,400 accounts (not necessarily enumeration districts), had been sent forward for payment, the remaining accounts being temporarily

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withheld for certain corrections in the returns for agriculture and manufactures; but practically all these accounts were released for payment by the close of the month of September. The work of preparing the schedules for punching was carried along in conjunction with the actual work of punching the cards, which was commenced with 25 operators on June 18 and increased from day to day, until 915 operators had been assigned by July 25, and upward of 1,000 operators were employed daily after the middle of August until its completion the latter part of October. The work of keyboard punching, as it is termed, was completed on October 26, and the work of machine tabulation on October 27, representing the punching and counting of over 76,000,000 cards within a period of a little more than four months from the date of the receipt of the first returns from the census enumerators. As a result of this work a preliminary statement of the population by states and territories was made public on October 30, and the verified statement, to be used as a basis for the apportionment, was promulgated one month later, or on November 27, 1900.

Following the completion of the work incident to the announcement of the count of population for apportionment purposes, as above summarized, it was necessary to punch something like 15,000,000 family cards, from which are derived the statistics of dwellings and families, the ownership of farms and homes, and other related data, in addition to the 76,300,000 cards from which are derived the purely individual data, in order to produce the statistical data covered by the Report of Population and representing, approximately, 2,000 pages of tabular matter and 400 pages of introductory and textual matter, and thereafter to handle these punch cards (individual and family) in whole or in part 10 different times. This number of different handlings represents a single handling of upward of 450,000,000 cards, that is, eqivalent to the passing of that number of cards once through the electrical tabulating machines. Of the work of purely machine tabulation very nearly 84 per cent has been completed to date, and the present condition of my work is

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such that not only will Part I of my report be issued during the month of December, but there is every assurance now that Part II can be published on or before July 1, 1902, or within the time specified by the Census Act.

It is well recognized that the value of statistics depends largely upon the speed with which they are collected and compiled and, therefore, made available for the uses for which the original inquiry was instituted, but it is manifest that no success in this direction can be achieved in census work, as now regulated, without an undue, and to a very considerable extent unnecessary, strain upon the energies of the responsible heads of the several branches and the forcing of the entire clerical force, to the imminent danger of committing serious errors, of omitting important data which, in the rush of preparation and tabulation, are apt to be overlooked until it is too late to remedy the error or omission without delaying the completion of the work as a whole. It is apparent, furthermore, that sufficient time is not permitted for the exercise of a proper amount of thought and care in providing for the multitudinous details of the work incident to the enumeration of a large population and its proper compilation, and the burden of responsibility which is concentrated upon a relatively small number of experienced persons is likely to become too great sooner or later, if provision is not made for the maintenance of a permanent census organization and the retention at least of a nucleus force of trained experts and experienced clerks and employees at all times.

As long as the office remains on a purely temporary basis, moreover, there is another important consideration to be borne in mind, and that is the uncertain tenure of employees, making it almost imperative after the first rush of the census work is over for trained employees to seek other employment because there is no future in the census work. This is already beginning to be apparent at the present cen-

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sus, and as we near the completion of the two-year limit of work we are likely to lose the services of very many valuable employees on this account. It is absolutely essential to the successful conduct of the next decennial enumeration that the nucleus organization of this division be kept intact, as nearly as may be, as the enumeration of 1910 of very nearly 100,000,000 inhabitants will require the services of every trained employee that can be made available.

There will be plenty of work for this nucleus force to do in the prosecution of the work required by the special subjects of investigation, which under the law are to be taken up upon the completion of the general reports, as well as in the completion of the data contained on the individual and family cards which are of somewhat special signification and which could not and need not under the law be included in the general report on population; and it may also seem desirable at a little later period to consider under a permanent organization the desirability of more frequent enumeration or investigation along the lines of that which has come to be considered an essential part of the purely decennial work. It is necessary, also, that some part of my force should be kept intact, in its responsible capacity, at least, in order that, immediately upon the completion of the general work in 1902, the records of that portion of the work of the Twelfth Census may be brought to a proper conclusion at an early date, so that they may be available for use in suggesting the legislation essential to the prosecution under proper conditions of the next general or partial enumeration at whatever date it may be ordered.

BY MR. NORTH, CHIEF STATISTICIAN FOR MANUFACTURES.

1. The work of the division of manufactures is extremely complicated and technical. It requires the service of clerks not only carefully trained in statistical methods, but familiar with the business and details of manufacturing in many lines of industry. Properly trained clerks to take charge of the

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different branches of the work of the division are hard to find. In the present census we have been obliged to train most of these clerks from the raw material. Notwithstanding the readiness of the Director to appoint experienced clerks of the last census, whose services I desired and could obtain, I was not able to secure more than four, including the chief of division, who had served in the Eleventh Census and there demonstrated their capacity to direct the work of others. The remainder have come to the front through the direction of the law of the survival of the fittest; and as the work draws to a close they are becoming competent to properly handle it.

With the breaking up of the office these clerks will disappear; the qualities they have here displayed will win for them desirable positions in private life; and at the opening of the next census the office can command the services of no more of them than were available in 1900. The kindergarten business will then begin again. It is an expensive business for the Government, involving loss of time and energy, and sometimes consequences far more serious. If the office were permanent, many of the specially skilled and peculiarly qualified clerks would consent to remain in a service that offered a permanent career. They would be profitably employed on the intervening work, and at the commencement of the Thirteenth Census the nucleus of the division of manufactures would be already organized at the highest point of efficiency. In this respect the work would begin where we shall leave off, and it would be correspondingly better done at each of its several stages.

2. Another distinct and important advantage would spring at once from the existence of this nucleus of trained clerks. It would enable the office substantially to dispense with the services of the expert special agents, upon whom it has been compelled to rely in the last three censuses.

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It is not possible to make a scientific and satisfactory report upon the growth and development of great and complicated manufactures — like that of iron and steel, for instance — without the assistance of experts thoroughly familiar with the industry, and capable of co-ordinating its statistics with a knowledge of their true significance. For the Twelfth Census we have utilized the services of some sixteen experts in as many special industries — men who are employed in other walks of life, and whose services to the Census Office have been in addition to their regular occupation, and who have been obliged, therefore, to perform their census duties at their own places of residence, with a small body of clerks detailed, in each case, to assist them. The compensation allowed special agents is not sufficient to enable the Census Office to command the entire time of properly trained experts of this character; hence the necessity of this wide scattering of the work, and the maintaining of different offices in various parts of the country, at a great increase in its cost. Up to the 1st of October, the cost of expert service, including clerks, rent, etc., was $87,694.71.

With a permanent census office, the service of expert special agents could be substantially, if not altogether, dispensed with; for they would be required, if at all, only for a brief interval at the beginning, to assist in formulating schedules in keeping with the latest development of the industries, and at the end to prepare the text to accompany the statistics, after they had been collected, tabulated, and placed in form for final publication. Even this brief outside assistance could be dispensed with in most industries; for, with a permanent office, there would develop in the division a number of clerks trained to a thorough understanding of the technical details and intricacies of the industries specially treated who could severally take charge of the statistics of these industries in the census office itself, with full knowledge of census methods and requirements. A perma-

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nent census office would have its own experts in every line of inquiry; a temporary census office never can have them.

The cost of maintaining the expert agents and their independent offices would thus be dispensed with, and at the same time the work would be more efficiently and satisfactorily done. Difficulty arises in dealing with the expert agents, by reason of the fact that they are not themselves as a rule trained in census methods, and are not always amenable to census discipline. The gain to the office and to the work as a whole, along the lines indicated above, would be sufficient, in and of itself, to justify the establishment of a permanent census office, so far as the division of manufactures is concerned.

3. With a permanent census office the original canvass, or field work, could be greatly improved. The weakest spot in the census work is, and in the nature of things always must be, the field work, which is the substructure of the whole census. The work of the enumerators in returning the manufacturing schedule was pronounced by Superintendent Porter to be "practically worthless." While that was a very sweeping condemnation, I regret to be obliged to say that, at the Twelfth Census, the enumerators' work on this schedule has not shown any marked improvement over that of ten years ago.

It follows that the canvass of the manufactures of the country must be assigned more and more to special agents, eliminating the enumerators except in remote rural districts. But not even the special agents can be depended upon for accurate and satisfactory work. They are, as a rule, men without training in gathering statistics, and the number of blunders made by special agents in filling the manufactures schedule of 1900 was in the hundreds of thousands.

To improve the quality of the field work the Twelfth Census inaugurated a plan of instruction and inspection, the good results of which are everywhere apparent. A dozen

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or more trained men were kept in the field during the canvass, traveling from city to city, to instruct the field agents, to call attention to errors, and generally to expedite and improve the work.

The success of this method of inspection and instruction was so marked as to make it certain that no manufacturing census will ever again be taken without this direct supervision of the field work. In 1900 we were so fortunate as to obtain a dozen thoroughly trained field agents, through the courtesy of Carroll D. Wright, Commissioner of Labor, who was able to spare the number from among his field agents for temporary census service during the four months of the canvass. But for this good fortune the plan of field inspection would have failed for lack of properly trained experts. With a permanent census office, its regular complement of clerks would always be available for this supervisory field work, as there is no service in connection with the census of manufactures where their work would be more effective.

4. With a permanent census office, there would be preserved the traditions and the records of previous censuses. It is not possible to exaggerate the importance of this advantage or the evils which result from its absence. One great purpose of a census of manufactures is to create a *measure of industrial growth*; and the value of that measure must depend, in a very large degree, upon the scientific accuracy of the comparison between censuses. As industry becomes better organized, as the utility of statistics becomes better understood, as the possibilities of securing exact data increase, so does the importance of uniformity in methods and in results increase. So long as the census office is decennially abandoned and reorganized, this feature of uniformity — the first essential in scientific census work — is impossible of attainment. With each breaking up of the office, the *tra-*

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ditions are scattered to the four winds. The "hows" and "whys" of everything, of every step, of every process, which become ingrained in the *personnel* of an office, which spread through all its rank and file, which descend from man to man, and, so to speak, make the office atmosphere, are destroyed; and thus is lost the most valuable accumulation — next after the tangible results, in every great work — the combined and commingled and aggregated *experience* of those who have been engaged in it.

With the experience, go also the records; at least such has been the case in the past. At neither the Tenth, Eleventh, nor Twelfth censuses were there any records available, except in isolated instances, in the work of the manufactures division. What we did get from the last census, was in such condition, after storage in careless hands, so mutilated, disarranged and inextricably disordered, that the material was practically useless. Thus the division had to be reorganized *de novo*. The traditions were gone, the records were lost, or preserved in inextricable confusion, and we must needs grope our way, from step to step, and stage to stage, not always sure of the right methods until we had tried several, and without any advantage of the previous experience of the division in the trial of those methods; without definite certainty at many points as to whether we were preserving sufficiently the methods of treatment previously adopted as to preserve the comparability of one census with another. As a matter of fact — and more strictly, perhaps, in the division of manufactures than anywhere else — exact and scientific comparability of the statistics exists at very few points, and, in the nature of things, can not exist so long as the division is torn up by the roots at the close of each census, to be built up again at a later date by a body of officials who must in most cases be new men, unfamiliar with the past.

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Some illustrations of the lack of uniformity in the methods of the office — traceable in nearly every instance to the fact that it is not a permanent bureau — will add to the force of this argument. Up to and including the census of 1860 mining was reported as a manufacturing industry. In the report for 1870 General Walker states: "The following tables do not embrace the statistics of the mining or the fishing industry of the country, both of which in 1860 were included in the manufacturing statistics of the census, but which in the present publication will be found presented in separate and independent tables." The census of 1870, however, includes returns for the smelting and milling of ores, and concentrating plants when it was possible to separate that branch of the industry from mining. The reports for 1880 and 1890 do not include either mining, concentrating, milling, or smelting, the only branches of this industry reported being the "smelting and refining base scrap metal, not from the ore," and "gold and silver reduced and refined, not from the ore." The report for 1870 includes "gold and silver reduced and refined" and includes those making the reduction from the ore as well as old silver, gold, and scrap metal.

The manufacture of gas was included as a manufacturing industry for all censuses expect that of 1880, when it was omitted by reason of the death of the special agent who had charge of the investigation. Petroleum refining was not included in the report on manufactures in 1880, but was so included in all other censuses. Petroleum refining and coke formed the subjects of separate reports in that census, and coke was included in the general report, while petroleum was omitted. In 1880, and possibly prior censuses, all establishments engaged in tanning and currying leather were counted as two establishments, one for tanning and one for currying.

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The following industries were not reported in 1880, but were included in 1890. Some of these are again omitted in 1900.

Bottling.

Cars and general shop construction and repairs by steam railroad companies.

China decorating.

Clothing, women's, dressmaking.

Coffins and burial cases, trimming and finishing.

Cotton, cleaning and rehandling.

Cotton, ginning.

Cotton, waste.

Druggists' preparations, not including prescriptions.

Drug grinding.

Gas, illuminating and heating.

Hay and straw, baling.

Millinery, custom work.

These changes in the scope of the manufacturing census affect its value as a basis for measuring the comparative growth of the manufacturing industry. But they are all obvious variations, for which allowance can be made in a general way. They are as nothing, in their effect upon the comparability of the figures, in comparison with the internal differences, due to different methods of treatment, many of which are concealed beyond reach of detection. They exist everywhere and must always exist, and must always vitiate the statistics, so long as each succeeding census is compelled to be a law unto itself, by its divorce from its predecessors. Changes there must be, in the work, from decade to decade. Schedules must at times be modified, as the result of experience, or to correct error, or to take cognizance of changes in the methods of industry. Industries change; some disappear; others take their places; classifications can not be kept absolutely uniform, because nothing in industry is unaffected by the universal law of change which underlies

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all progress. But because these changes and modifications are necessary, so much the more important is it, that they should always be made — as could be the case were the office permanent — in harmony with the traditions of the past, and in such a way as to reduce the dislocation of the statistics to a minimum. At present, they are made haphazard, and largely in the dark. Just how far they affect the integrity of the figures, we can never know. But we do know that strict conformity to the requirements of scientific statistics is impossible, except through the establishment of a permanent census office.

I conceive it to be possible, in a permanent census office, that no questions can arise at any stage of the work upon which it would not be possible to throw some light, if the records of the office were properly preserved and handled by the clerks who had a hand in their making. The scattering of these records and the destruction of precedents represent the loss of valuable and tangible property of an intrinsic value which it is difficult to measure by money standards; and in comparison with which the small annual cost of maintaining the division for the few years intervening between two censuses is not worthy of consideration.

5. It is doubtful, in the distribution of the census work provided for in the present Census Act, whether there need be an increased cost, so far as the division of manufactures is concerned, as the result of the establishment of a permanent census office. Section 8 of the act of March 3, 1899, provides that, after the completion of the work upon population, agriculture, manufactures, and mortality, certain special statistics shall be collected, including those relating to electric light and power, the telephone and telegraph business, transportation by land and water, the express business, street railways, and mines, mining, and minerals. The Director of the Census has indicated his intention to entrust the work relating to the special industries

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above enumerated to the division of manufactures. We shall be ready to undertake it promptly upon the completion of the work in which we are now engaged, on or before July 1, 1902, the date fixed by law. These inquiries will occupy the time of a selected clerical force for two years or more. Undoubtedly there will be other statistical work along the general lines of the division of manufactures, which Congress could with advantage instruct the census office to undertake.

In this connection I desire to emphasize the advantage to the country, and more particularly to the cotton growing states, that will result from an annual census of the cotton crop, through the agency of the cotton ginners — a census which has now been twice most successfully conducted in the division of manufactures, and which has met with marked approval in the section of the country chiefly concerned. It is generally agreed by experts that the only accurate method of measuring the annual cotton crop is by returns from the ginners, through whose establishments every pound of the crop must pass before it becomes commercially available. There can be no question that the methods and facilities of the census office are better adapted to this particular inquiry than those of any other bureau or department of the Government.

Again, it is generally agreed among statisticians that a ten-year census of manufactures is too infrequent an inquiry to permit accurate and satisfactory judgment to be formed regarding the industrial progress of the country. The census may be taken at one decade, in a period of abnormal depression in industry, and, at the following decade, in a period of abnormal expansion and production. Such a period was actually in progress when the census of 1900 was taken. Comparison between censuses taken under such different conditions and with so long an interval between them, does not afford a satisfactory basis upon which

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to measure the industrial progress of the nation. It was frequent enough, fifty years ago, when the factory system was in its infancy, and our manufacturing development was slow. But, with the opening of the twentieth century, we have reached a stage where the progress of a single decade marks an advance greater than that of an entire century prior to the days of perfected machinery and the full application of steam and electric power.

If there existed a permanent census office, it would be possible to take a quinquennial census of manufactures, which would be of enormous statistical, industrial, and economic value, and which would enable the government to measure and record the means and the degree of our industrial advance in a number of industries, with which it can only deal in the most general way under the present system.

In making this suggestion, I do not propose a five-year census along the same lines that the decennial census is conducted, including all the mechanical industries and hand trades of the country, but simply a census of manufactures proper — the great leading industries conducted under the factory system, and which produce nine-tenths of the total manufactured product, as shown by the decennial census. Even if a ten-year census of the mechanical industries and hand trades is worth while — which I doubt, for reasons that it is unnecessary to state in this connection — it would be entirely unnecessary in the quinquennial census suggested, because these local and neighborhood industries are but slightly affected by changes which make for prosperity or depression in the general manufacturing enterprises of the country. By eliminating these mechanical industries from the work, the canvass could be conducted at a comparatively small expense. I am convinced, that, with the aid of the records of the office and the lists of manufacturing establishments which it posesses, and which it can re-

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vise from year to year, keeping it complete and up to date, the whole field work can be completed at a cost not to exceed one-fifth of the cost of the field work for the Twelfth Census, which was $454,416.75.

We expect to present the results of the Twelfth Census in in such form that the suggested quinquennial manufacturing census would be perfectly comparable with the corresponding ports for the year 1900. It can be prepared by a comparatively small force of clerks, who would have all the advantage of their training in the Twelfth Census, and who would thus be kept busy, in the preparation and compiling of the quinquennial census, up to the time when it would be necessary to begin preparation for the work of the Thirteenth Census. So that, if this recommendation should be approved and adopted by Congress, there would exist no interval at all, during which there would not be plenty of work for the division of manufactures to do, and work that would be of the utmost value to the country.

6. There is an immense undeveloped field of work open to the division of manufactures, in the direction of special reports on industries, which it is now compelled to handle only in the most general way; and in the statistical presentation of the direct relationships of capital, wages, and product in all the industries, which it is impossible to properly and scientifically handle, in treating the immense mass of material which is thrust upon the office in one lump by the decennial census. The haste with which the materials must be compiled, in order to present results with reasonable promptness, compels the abandonment of many forms of data which possess great economic and sociological value. If the office were permanent, all this material could be properly prepared for public use during the interval between censuses, and the country would thus obtain, what it does not now get, the full benefit of the enormous expenditure involved in the original gathering of this material.

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I have refrained, in this communication, from any allusion to the waste that necessarily occurs in the rapid equipment every ten years of a great office like the census. These great expenditures, the recurrence of which would largely be avoided were the office made permanent, are not peculiar to the division of manufactures. I have confined myself to questions relating directly to my own division; but I may add in conclusion that I believe the saving that would arise, in the way just stated, would be sufficient to defray a large part of the cost of maintaining the division during the interval between censuses.

BY MR. POWERS, CHIEF STATISTICIAN FOR AGRICULTURE.

1. With the expansion of our national domain, and the progress of our country in all that relates to the cultivation of the soil, it becomes increasingly difficult to secure reliable statistics of the agricultural resources and products of the United States. It also becomes more and more desirable, if not absolutely necessary, to have the collection, revision, and tabulation of that data in the hands of experienced agents. Only such agents can successfully cope with the new and complex problems that present themselves with each decade. Without a permanent census office it is difficult, and almost impossible, to secure assistants who were employed in the preceding decade, and who are, by reason of such employment, familiar with the work of handling the vast mass of data collected in an agricultural census. In the Twelfth Census it was possible to secure the services of but *two* clerks of ability, who had been employed in any responsible place in the Eleventh Census. The office had to depend upon chance in its efforts to secure clerks familiar with the agricultural resources and products, with crops varying in character from those of the tropics to those of the arctic regions. With the further extension of our territory and the increasing complexity of agricultural condi-

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tions, it is doubtful whether an agricultural census taken, in 1910, under like conditions, will not break down of its own weight and immensity.

The Twelfth Census has received reports from nearly 6,000,000 farms. To complete its agricultural schedules about 1,250,000 letters had to be written. Methods will have to be adopted that will secure more perfect schedules at the outset, thus lessening the relative and actual number of letters to be written, and simplifying the work of the office. A reliable agricultural census can be secured only by such prior preparation as could be brought about by a permanent office in charge of the work, with clerks of ability, who would bring to their duties training and experience in the most difficult part of census-taking — the handling of agricultural data.

2. A permanent census would secure to the office the services of men trained not only in methods of handling census data, but familiar with all the varying crops and products of the country, and thus better able to detect and correct erroneous reports on the part of the enumerators.

3. Unlike the division of manufactures, the agricultural division must depend for the collection of its statistics almost wholly upon the enumerators, who are appointed in all parts of the country. In 1850, with 25,000,000 people, and a fairly uniform system of agriculture, it was comparatively easy to harmonize the returns made by the enumerators. With 90,000,000 (which we will have in 1910), and with a very complex system of agriculture, that work will be very difficult. It must begin with some sort of training of enumerators. They must be instructed in their duties, and so enabled to return more correct reports. This instruction can not be given unless the Census Office has a sufficient number of trained experts at its command to send into the field for the purpose of educating the enumerators in their duties so as to lessen the subsequent work, especially

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in the line of correspondence for necessary corrections in the office at Washington.

4. A permanent census office would increase the value of the statistics published. They would be collected under more uniform conditions from decade to decade. With the best of intentions, no two men, not familiar with each other's methods, can collect and tabulate such a mass of statistics as is contained in an agricultural census, and conduct all of the work under similar conditions. A permanent census, retaining a number of efficient employees, would preserve the traditions of the office and would lead to greater uniformity and accuracy in the statement of results and to an earlier publication of the same, thus making them of greater value to all students of economics and to the farming communities.

5. A permanent census would also tend materially to lessen the expense. One great source of outlay in this division is in perfecting the schedules. More perfect instruction of the enumerators would greatly lessen the work of perfecting the schedules in the office. Clerks familiar with their duties at the outset could avoid much of the experimenting that under present conditions is absolutely necessary, and in this as well as in other ways the expenses of the division could be materially lessened.

6. The business interests of the nation are finding each year greater use for more accurate annual estimates of the leading crops of the country, as well as of the number of domestic animals. Experience shows that, to insure the correctness of these estimates, a census of live stock, and of the leading crops of the country, should be taken every five years. A permanent census would permit the collection of such statistics, with but a moderate increase upon the present cost of the census statistics of agriculture.

7. A permanent census with expert clerks would permit the collection, with no great additional outlay of money, of

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many very important and valuable statistics relating to farm tenure, the cost of producing crops and kindred subjects. These, if collected, would make the present statistics of agriculture more valuable to all interested in them.

BY MR. KING, CHIEF STATISTICIAN FOR VITAL STATISTICS.

One of the most important branches of census work consists of that relating to mortality and vital statistics. These statistics are of direct importance to each person, for in none other can the deductions and conclusions derivable from them be so certainly employed to promote individual health and welfare.

Accurate vital statistics are essential to the determination of questions arising in every branch of social science. Reliable mortality statistics are of supreme importance as the very basis of sanitary science and practice; but, to afford data for reliable deductions and sound conclusions, these statistics should be compiled and published much more frequently. The results for one year in every ten may be normal, or they may be greatly abnormal, as the conditions vary which affect the public health. The data should be available for each year, to compare results under the different conditions existing.

In a large portion of the country the states and cities have provided for the registration of deaths, and the facts are of record and available for statistical purposes most economically, without any such expense for the collection of the original data as attends investigations requiring a field force.

The registration area in 1900, as given in the Twelfth Census reports, comprehended a population of nearly 29,000,000, or about 38 per cent of the entire population of the country. It then embraced 10 states and 153 cities of 8,000 or more population in other states. Since then the two great states, Illinois and Indiana, have enacted laws which promise satisfactory results, adding 5,000,000 to the

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population represented, and the movement is constantly growing in other directions.

Congress has recognized the necessity for additional information on the subject by providing for the preparation of "statistics of births and deaths in registration areas," as a part of the supplemental work authorized to be taken up after completion of the census proper.

The registration data available are required only by local laws or ordinances. There is no national system of registration, and no means of collecting, compiling, and reducing to a uniform series of tabulated statistics the data recorded under the various local provisions, except such as is afforded by the Census Office.

A large amount of money is expended by local authorities in preparing more or less complete reports, but the methods are hardly identical in any two places, and the results are not comparable. In most cases the statistics published are very meager, and but few of them attempt anything like the comprehensive compilations of the census, which are essential to thorough analysis.

This office is now acting in conjunction with a committee of the American Public Health Association, consisting of Dr. John S. Fulton, of Baltimore, Md.; Dr. Samuel W. Abbott, of Boston, Mass.; Dr. Charles V. Chapin, of Providence, R. I.; Dr. H. M. Bracken, of St. Paul, Minn.; Dr. Cressy L. Wilbur, of Lansing, Mich.; Dr. Wm. H. Welch, of Baltimore, Md.; Mr. M. N. Baker, of New York, N. Y.; and Dr. William C. Woodward, of Washington, D. C., (most of whom are the leading officials in the vital statistics work of the states or cities they represent) in deciding and formulating the essential features of a comprehensive and effective law for the registration of deaths, a standard form of certificate or return to be used in reporting deaths, and the best practice to be followed in recording, filing, and transmitting the local returns, so as to make the data uni-

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form, to increase the sphere of their usefulness, and to render them more completely and promptly available for the census statistics.

This work will have the approval of the American Public Health Association, the American Statistical Association, the American Economic Association, besides other statistical and scientific bodies, and Government and state officials, and will represent the combined views and practical experience of all those most directly interested in this class of statistics.

It will be of the greatest value in promoting the extension of the registration system along lines of practical scientific value, and of inducing reforms in existing local laws and methods necessary to secure uniformity of results.

This, however, will require time and continuous work. It can not be effected at once, nor by spasmodic efforts at intervals, and a permanent organization of the census office, acting as a central compilation bureau, will contribute powerfully to this end.

It is estimated that records of something like 600,000 deaths will be available from states and municipalities which — in the language of the Census Act — "possess registration records affording satisfactory data in necessary detail."

For these an annual report may be made which will give, in a condensed form, all of the principal results for comparative purposes, which will still be more extensive and valuable than any now existing, and which can be expeditiously and economically compiled and promptly published. The cards used in the preparation of such reports will then be available for more exhaustive compilations, covering any desired series of years and affording average annual rates and ratios of still greater value.

For this purpose we now have a force of clerks who have been trained and educated in this kind of work, whose

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capabilities have been tested and proved, who can enter upon this work with an adequate knowledge of what they will have to do, and whose experience will enable them to improve upon their earlier efforts. From the number now employed the most capable can be selected to form the small force required.

I feel sure that the Twelfth Census work on this subject has been performed as economically as was possible with an entire force of inexperienced clerks, but I *know* that it could be repeated, or similar work done by them, now that they have gained experience, not only with much less expense, but also much more quickly.

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REVIEWS AND MISCELLANY.

NOTES ON FOREIGN CENSUSES.

The French Census of March 24, 1901, the results of which were published in August, shows a total population of 38,641,333, an increase of 412,364 since 1896, or about one per cent. Although this is a higher rate of increase than that between 1886 and 1896, it is so low as to cause considerable anxiety to French publicists. Paul Leroy-Beaulieu analyzes some of the census results in *L'Économiste Français* (July 6, 1901, p. 11, and August 24, 1901, p. 262), and incidentally criticises severely several details in the practical taking of the census. He points out that the slight improvement as compared with the period prior to 1896 was to be expected on account of a reduction in mortality due partly to a decreased prevalence of influenza and also on account of unusually good industrial conditions, including the exemption of the wine industry from the attacks of the Phylloxera. Of the 87 departments, only 28 have increased in population during the last five years. That of the Seine alone has gained 289,662, or nearly three-fourths of the total gain for the nation; this represents an increase of almost 9 per cent. The other departments which show a growth in population are almost all on the frontiers, the most marked increase being along the Mediterranean. In all cases the cities, for example, Marseilles, Nice and Toulon, exhibit the greatest gains. Only four of the departments in the interior have held their own in population; and in the richest regions of Normandy, Gascony and Burgundy, a general and, in some cases, very startling decrease is manifest. While the population of France since 1850 has only increased by 3,340,000, that of Italy has gained nearly 9 millions, that of Great Britain more than 14 millions, that of Austria-Hungary the same, that of Germany 21 millions, and that of Russia 62 millions. M. Leroy-Beaulieu dwells upon the immigration, which is already beginning, from] adjoining

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territories, as an evil; and advises checking the decrease of native population by reducing the French death-rate through sanitary precautions and by increasing the birth-rate through favors and exemption granted to families with three or more children. The reduction of the death-rate is, no doubt, possible; the other part of the program seems less practical. To an outsider, (see editorial in the *Economist* for June 22, 1901), it seems, in the first place, that the conditions existing in France are not unmixed evils, as a small population may be made a very efficient one both in a commercial and a military sense by intelligent training; and, in the second place, that an increase of population by immigration need not necessarily be deplored.

The decrease in the rural population of France is discussed at some length by Emile Chevallier in *L'Economiste Français* for June 8 and June 15, 1901 (p. 806 and p. 846). The proportion of the population living in towns of less than 2000 inhabitants has fallen, during the period 1846-96, from 75.6 per cent to 60.9 per cent. Individual districts have lost one-third, or even one-half, of their population during that period. This is not due, as in other countries, simply to emigration toward the industrial centres, but largely to a decreased birth-rate. In many towns the deaths during recent years have greatly exceeded the births, in some cases, by one hundred per cent. The birth-rate per one hundred inhabitants in one district was 3.4 in 1799 and 1.7 in 1899; in another district it was 3.3 in 1800 and 1.4 in the period 1896-98, etc. The cause of these phenomena is, of course, the exaggerated prudence and ambition of the small cultivator, leading him to limit his family in order that his children may be prosperous. In one district, in particular, it is noted that "the fathers and mothers of large families are turned to ridicule." Emigration to the cities has also, of course, played an important part in the depopulation of the rural districts. The following table shows the increasing number of such emigrants from one commune:

Period.	*Males.*	*Females.*
1844–50	1	3
1850–60	19	18
1860–70	16	6
1870–80	20	13
1880–90	20	13
1890–99	27	25

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M. Chevallier points out the relation of the movement of population to the introduction of railways, to the inoculation of the young farmers with the virus of town life during the enforced period of military service, and, in particular, to the improvements in agricultural machinery, which have driven many of the laborers out of employment.

The decennial census of Great Britain and Ireland was taken on March 31, 1901, or just one week after the French census; and its results are much more encouraging than are those of the latter. It shows a total population for the United Kingdom of 41,454,219, against 37,731,922 in 1891, a gain of about 10 per cent. In England and Wales, alone, the growth is still more striking, as is shown by the following figures:

	Population 1891.	*Population 1901.*
England and Wales,	22,002,525	32,525,716
Scotland,	4,025,647	4,471,957
Ireland,	4,703,750	4,456,546

While England and Wales have increased by about 12 per cent, and Scotland by about 11 per cent, Ireland has lost more than 5 per cent of its population. The rate of increase for England and Wales is slightly greater than that of the previous decade (12.15 against 11.65 per cent.) In a valuable review by Edwin Cannan (*The Economic Review*, XI, 1901, p. 358), it is pointed out that, while the excess of births over deaths was somewhat less between 1891 and 1901 than in the previous decade, the net loss by excess of emigration over immigration was diminished in a greater degree, having fallen in the United Kingdom from 1,556,803 to 589,887. In England and Wales the net loss in the ten years by emigration is only 70,003, and as the emigrants include some 150,000 troops in South Africa, it appears that this portion of Great Britain has actually been colonized rather than colonizing. Ireland, on the other hand, has lost heavily by emigration, though much less heavily than in the previous decade; her proportion of 32.6 per cent of the population of the United Kingdom in 1801 has fallen to 10.8 per cent. M. Leroy-Beaulieu in *L'Economiste Français* July 20, 1901, makes the decrease of the population of Ireland from 8,000,000 to 4,500,000 in sixty years the text for a vehement and not unde-

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served phillippic against the social and political régime under which it has occurred. In all parts of the United Kingdom the tendency to urban concentration of the population is shown with great distinctness. While the increase in the rural population of England and Wales is only 2.9 per cent, that of the urban districts is 15.2; and Cannan believes that if town outskirts and suburbs were excluded from the first class an actual decrease would be shown. The population of greater London has increased 17 per cent, reaching 6,578,00, or more than one-fifth of the total for England and Wales. Even in Ireland, Dublin and Belfast have increased by 7.9 per cent and 27.8 per cent respectively; and in Scotland, the county of Lanark, including the city of Glasgow, has gained 232,000 persons, more than half the total increase for that Kingdom. In general, the seaport and railway works towns show handsome gains, while the cotton and woolen districts in the north of England have grown but slowly. An extraordinary mistake was made in the first published results of the census in the table showing the per cent of increase in urban districts of various sizes. Instead of comparing the same towns at the two periods, 15 towns having between 100,000 and 250,000 population in 1891 were compared with 24 towns of the same size in 1901, giving a rate of increase of 44.61. A corrected table was published later, from which the following is extracted:

Urban Districts with Population of	Number of Districts.	Mean Percentage Increase 1891–1901.
250,000 and upward	9	9.32
100,000–250,000	24	17.74
50,000–100,000	42	23.15
20,000–50,000	141	20.37
10,000–20,000	219	18.44
3,000–10,000	472	12.40
Under 3,000	215	4.60

The German census, taken December 1, 1900, gives a population of 56,345,014, an increase of 7.78 per cent since 1895, the highest rate yet recorded. Berlin has now 1,884,151 inhabitants, an increase of 11.6 in the quinquennial period. The growth of the population is due to the high birth rate (37.1 per thousand for the three years

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1894-96), and to the decreasing death rate (30.62 in 1872, 22.9 in 1894-96). The excess of births over deaths is greater than in any European country except Russia.

A valuable paper by J. A. Baines in the *Journal of the Royal Statistical Society*, vol. LXIV, 1901, p. 493, contains reviews of all the recent censuses. The author notes the lessening rate of increase of population, both in the new and the old world. The mean decennial rate for the first half of the nineteenth century was 15.05 in England and Wales, and that for the second half only 12.66. In the United States the corresponding figures are 34.3 and 26.7. Mr. Baines suggests the correlation of the comparatively low rate of increase in the United States between 1890 and 1900, which was only 20.7, with the decreased emigration noticed above in connection with the English census and also indicated by returns from Germany and Sweden. In Mexico the new census shows an increase of 7.2 per cent in the country at large; the capital has increased by 13 per cent; but otherwise the smaller districts show the greater gains. The Canadian census for 1901 shows a population of 5,338,883, an increase of only 10.46 against 11.75 for the previous decennium, and 18.75 from 1871 to 1881. The lessened increase in 1891 has been attributed to the fact that in that year, for the first time, the rule prevailed that persons who had been out of the country for a year or more should not be enumerated. The 1891-1901 increase in Lower Canada was small, 5.2 per cent, and in the Atlantic seaboard districts only 1.4 per cent, while the Northwest and Pacific coast region shows an increase of 87.7 per cent. The Government estimate of immigration into Canada during the decennium is 500,000, about equal to the increase in population. It therefore appears that the normal growth of population by the excess of births over deaths has been just neutralized; and the balancing force must have been a slow filtering of the Canadian population across the border into the United States. In reviewing the German census, Mr. Baines points out that, while France has had an annual increase of 23 per ten thousand during the last twenty-nine years, Germany has a corresponding figure of 110; furthermore, the German rate has steadily risen since 1880. Prussia now contains 61.17 per cent of the total population; Bavaria 10.96; and Saxony, 7.45.

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The towns of over 100,000 inhabitants contained, in 1900, 16.17 per cent of the total population, and their increase between 1895 and 1900 was 17.7 per cent. The Italian census of February, 1901, is the first since 1881, and shows strikingly the error introduced into vital statistics by basing estimates of population on infrequent enumerations. The estimate for the whole Kingdom based on the growth between 1871 and 1881 was within 1.2 per cent of the actual value, but in the smaller districts divergencies of 6 to 12 per cent occurred. In Tuscany the estimate was 8.6 too low; in Florence 12 per cent two low,; in Rome 9.6 too high. The increase of the whole population since 1881 has been 14.02 per cent against 7.13 per cent between 1861 and 1871, and 6.19 per cent between 1871 and 1881. The greatest gains are in the inland cities, Rome having grown by 54 per cent and Milan by 53 per cent. The seaport towns have increased less rapidly. In spite of the drain of emigration (308,000 persons in 1899), only one district in Italy, the Basilicata, shows a decrease in population since 1881.

Austria and Hungary exhibit percentage rates of increase of 9.3 and 9.6 respectively during the last decade, and in both countries a large increase in population due to a rapidly declining death-rate has been partly balanced by an increase in immigration. In Switzerland, the census of 1900 shows the same fall in the death-rate. While the birth-rate fell only from 3.09 in the period, 1870-80, to 2.86 in the period 1888-1900, the respective figures for the death-rate were 2.36 and 1.96. The population of the nine large Swiss towns has increased by 63 per cent during the last twenty years, while the rate for the whole country has been only 16.9. The census of 1899 in the Netherlands furnishes some interesting figures on sex distribution; the excess of females in the smaller towns, under 20,000 inhabitants, has fallen from 18 per mille in 1830 to a deficiency of 1, while in the whole country the excess has fallen from 40 to 25. In Sweden the proportion of females to males had fallen to 1049 to 1000 in 1900, while the figures between 1850 and 1890 ranged between 1065 and 1061, and at the beginning of the census studies in 1750 the ratio was as high as 1129. The Norwegian population has increased during the last ten years at a rate of 1.10 per cent per annum, considerably above the Swedish rate of .71 per cent. The large towns of Norway show an especially rapid

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increase, the rate for the last ten years being 30.5 per cent for the urban, and 5.5 per cent for the rural population. The results of the Danish census of February, 1901, coincide with those of the other countries considered; they show an accelerated increase in population due on the one hand to a growing excess of births over deaths, and due, geographically analyzed, to great growth of the towns, and especially of those of medium size.

C.-E. A. WINSLOW.

NOTES ON VITAL STATISTICS OF AMERICAN CITIES.

The *Annual Report of the Board of Health of Manchester* (N. H.) for 1900 illustrates the importance of correct estimates of population in calculating death-rates. The estimated population for 1896 was 56,000, with a death-rate of 18.77. In the next three years the population was estimated at 60,000, which, with a slight actual decrease in total deaths, brought the rates down to 16.97, 16.68 and 17.80. In 1900 the population was found to be 56,987 and the death-rate jumped to 20.47. The ratio of deaths of children under five years to the total deaths is interesting, showing a progressive decrease between 1897 and 1900 of 61.98, 52.04, 50.65 and 48.07. The table of cases of, and deaths from, zymotic diseases shows, apparently, unusual success in securing reports of measles and scarlet fever. There were 762 cases of measles with 5 deaths in 1899, and 827 cases with one death in 1900. On the other hand, 46 cases of diphtheria and membranous croup with 13 deaths indicates either poor reporting of cases or neglect of antitoxin treatment. The separation of these diseases (diphtheria and membranous croup), in the table, and the summation of all the zymotic diseases are misleading.

The *Annual Report of the Board of Health of Worcester* (Mass), for 1900 contain some good anti-toxin statistics, as will be seen from the following table extracted from that on page 10 of the report.

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FATALITY RATE.— PER CENT.

Year.	Diphtheria.	Scarlet Fever.	Typhoid Fever.
1895	27.55	3.78	17.98
1896	19.85	2.67	11.02
1897	17.62	3.14	15.00
1898	11.48	2.32	16.04
1899	10.61	.17	18.26
1900	9.46	7.59	21.76

The total death-rate for the city rises from 15.89 for 1899 to 18.77 in 1900, a higher figure than any since 1893. This excess is due to an excess of lung and throat troubles amounting to nearly one-third of the total deaths. In the diagram exhibiting the relation of the twenty principal causes of death a not unusual conservatism has prevented the classification of tuberculosis and pneumonia as zymotic diseases. It is strange that so few Boards of Health accept the progress of medical science in this respect.

The *Annual Report of the Superintendent of Health of Providence* (R. I.), (Dr. C. V. Chapin), for 1900 shows the same excess of measles which prevailed in Manchester, N. H., as noted above, and in many other cities. There were 97 deaths from this disease in Providence in 1900, more than the deaths from scarlet fever, typhoid fever and diphtheria combined, but only 901 cases were reported. Valuable tables are given for typhoid fever, diphtheria and scarlet fever, showing the number of cases and deaths in each month since 1884. The average fatality for the whole period is 29.61 for typhoid fever, 21.81 for diphtheria, and 8.90 for scarlet fever, all much too high. Dr. Chapin's statistics with regard to the ratio between cases of diphtheria and scarlet fever and the number of persons exposed to infection (members of families of patients), covering the period 1889-1900, are of great interest. The ratio of cases to the number of persons exposed, classified by ages, show a rise from 19.9 under one year, to 49.0 between one and two, and 65 and various fractions from two to five years; then a steady fall to 51.3 between 8 and 9, and 40.1 between 12 and 13, more variable figures ranging from 19.0 to 33.9 between 13 and 21, and a fall to 8.7 for adults. For scarlet fever the figures are very similar.

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Under one year the rate is 24.3, between 1 and two years, 46.2, between 2 and 3 years, 59.2, between 3 and 8 years, from 63.5 to 69.4; from 8 to 17 years, an uninterrupted fall from 58.2 to 24.1; and for adults the ratio is only 4.7. Another table shows the percentage of well persons in families where diphtheria occurred in whose throats diphtheria bacilli were found. The average percentage for all ages for 1897-1900 was 16.2, the highest figures 34.1 and 34.0, being at the age of 4 and 6 years, and the figures for adults being 12.1.

More elaborate statistics for the city of Providence are found in the *Forty-sixth Annual Report upon the Births, Marriages and Deaths for the year 1900*, edited also by Dr. Chapin. This model report begins with an analysis of deaths by sex, social condition, nativity, parentage and season, in connection with which it is interesting to note, as typical of many American cities, that of 3678 decedents, only 2569 were natives of the United States and only 1402 were of American parentage. A table of the age of decedents by parentage shows that for forty-five years, 1856-1900, the average age of the children of American parents was 34-43 years, and for children of foreign parents, only 27.77. Deaths, classified by age periods, parentage and seasons follow, succeeded by tables of deaths by cause, sex, age, parentage and season. Each important cause of death is then studied, the statistics as to sex, parentage, age and season being given for forty-five years. The most striking fact in these tables is the extraordinary fatality from pneumonia and congestion of the lungs, in 1900, 261 per 100,000, the highest figure previously recorded being 217 for the period 1891-95. Of the 7568 deaths from these causes in 1900, 3062 occurred in the first quarter of the year, and 1379 of the decedents were under one year of age. The marriage statistics for forty-five years show average ages of 28.03 and 23.03 years for grooms and brides, respectively. Finally, the report contains an exhaustive analysis of birth statistics.

The *Annual Report of the Bureau of Health of Philadelphia* for 1900 contains rather meagre statistics considering the importance of the city. The high fatality rate for diphtheria is notable; in 1896 it was 31.96, and for the four following years, 27.28, 26.14, 20.40 and 17.97, respectively. The death rate for typhoid fever was 34.71 per

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100,000 in 1900, an improvement over the epidemic figure of 1899, which was 74.82. Tables of the age distribution of typhoid fever and the monthly distribution of that disease and of scarlet fever and consumption for 39 years would be rendered more helpful by the printing of totals. An addition of the figures for typhoid fever deaths by age periods for the ten years, 1891-1900, gives the following result:

Years.	Deaths.	Years.	Deaths.
Under 1	19	30-40	981
1-2	20	40-50	455
2-5	123	50-60	202
5-10	323	60-70	112
10-15	386	70-80	47
15-20	796	80-90	9
20-30	1819	90-100	1

C.-E. A. WINSLOW.

STATISTICS OF DISEASES.

The *Twenty-eighth Annual Report of the Secretary of the State Board of Health of Michigan* for the year ending June 30, 1900, contains, as usual, an interesting study of the relation of meteorological conditions to the prevalence of disease. The statistical material for this comparison is obtained from 214 medical observers who send in weekly reports of the relative prevalence of the diseases which have come under their observation, marking the disease of which most cases have been seen, one, and so on. The percentage of reports stating the presence of any disease gives for each week a sort of morbidity-rate which serves very well for comparison of the different seasons. The tables show that bronchitis, pneumonia, membranous croup, diphtheria, tonsilitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, and pulmonary consumption, or the "cold-weather" diseases, were reported on more than the average per cent of weekly reports, in months which had a relative humidity, an average per cent of cloudiness, ozone, average velocity of wind, and

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average range of the barometer greater than that for the year and an average daily temperature, average daily range of temperature, absolute humidity and average atmospheric pressure less than that for the year. On the contrary, the "warm weather" diseases, diarrhœa, cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles and whooping cough, bear an inverse relation to all meteorological conditions cited. The monthly relations of some of the most typical diseases of the two classes are shown by the following table, abstracted from several of those given in the report.

PER CENT OF WEEKLY REPORTS IN WHICH CERTAIN DISEASES WERE REPORTED. TWENTY-TWO YEARS, 1877-98.

Cold Weather Diseases	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bronchitis	71	72	71	68	58	49	41	40	46	53	62	66
Pneumonia	49	52	50	43	32	19	12	10	13	18	27	36
Influenza	72	66	64	56	40	27	19	19	27	32	42	53
Warm Weather Diseases												
Diarrhœa	26	26	28	29	32	41	66	80	76	53	33	26
Typhoid Fever	9	7	5	4	4	5	7	13	19	21	18	12
Cholera Infantum	3	1	2	2	3	9	27	41	33	12	3	2

Tha major portion of the Michigan report is devoted to a consideration of the communicable diseases reported during the year 1899. In connection with this work of the Board 8326 local newspapers are reviewed for information in regard to outbreaks of these diseases; 46 per cent of the newspaper reports were confirmed by the local Health Office, and 21 per cent were denied. The statistics given for the various diseases are of the highest value, including the relation of the maladies to concentration of population, disinfection and age and sex of the patients, as well as the average incubation period, and duration of fatal cases. The importance of concentration in the case of diphtheria is shown by the death rate of 2.60 per 10,000 population in cities, of 1.32 in villages and 1.26 in townships. This relation does not hold for scarlet fever and measles. The value of isolation and disinfection is indicated by the fact that during the thirteen years, 1887-99, there were 823 outbreaks of diphtheria in which

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both of these precautions were neglected, with an average of 11.75 cases and 2.41 deaths per outbreak; while in 910 outbreaks in which both isolation and disinfection were enforced, the average number of cases was 2.16, and of deaths, .45. The corresponding figures for measles are 54.03 cases and .43 deaths where precautions were neglected and 2.56 cases and .02 deaths in the 248 instances in which they were thoroughly carried out. The same striking relation is shown for scarlet fever and whooping cough, and even for typhoid fever. The fatality rates at different ages for certain of the infectious diseases are of considerable interest.

DEATHS IN EACH AGE GROUP, IN PER CENTS, OF THE CASES IN THAT GROUP.

Diseases.	Age.														
	0–1	1–2	2–3	3–4	4–5	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50 and over
Diphtheria.....	79	53	43	35	28	22	13	14	7	5	3	4	6	20	—
Scarlet Fever....	26	20	13	12	4	4	2	3	2	0	8	0	0	0	0
Measles.....	28	15	7	1	2	1	1	2	1	3	0	11	4	12	5
Whooping Cough	63	32	13	6	6	2	0	4	13	0	0	0	0	0	0

It is strange that only 14 cases of pneumonia were reported to the Board during the year, with five deaths. Of meningitis, on the other hand, 1306 cases were turned in; and the returns of most of the other diseases seem to show a very satisfactory system of reporting.

The question as to the prevalence of cancer is re-opened by R. Teece in the *Journal of the Institute of Actuaries*, for July, 1901, p. 89, under the caption, "The Increase of Cancer." Mr. Teece takes issue with the conclusion reached by King and Newsholme in 1893, that the "increase in cancer is only apparent and not real, and is due to improvement in diagnosis and more careful certification of the causes of death"; and the original paper of Mr. King and Dr. Newsholme is reprinted in the same number of the Journal. It will be remembered that these authors, in the first place, emphasized the fallacy of arguing from general death-rates when dealing with a disease mainly affecting certain age periods; and they corrected all their rates for the actual age distribution of the population. In the second place,

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they analyzed the statistics of cancer in the city of Frankfort according to the part of the body affected and showed that the greater prevalence of cancer among females was due entirely to cancer of the sexual organs,— cancer in other parts of the body affecting both sexes equally,—and that the increase of cancer from 1860 to 1889 was due to an increase of cancer in the internal organs, while cancer of the tongue, mamma, uterus and vagina has remained stationary. This, the authors considered, pointed conclusively to the importance of more accurate diagnoses in increasing the amount of cancer. Mr. Teece has carried on the tables given by King and Newsholme, bringing the statistics of the cancer deaths by age periods for England and Wales up to 1897. The steady increase noted by the previous observers continues in a marked manner, the deaths of males over 45 having risen from 1942.4 per million in 1881-97, to 2970.6 per million in 1895-87, and that for females having risen from 2990.0 to 3923.4. Mr. Teece thinks the rise during this latter period can scarcely be accounted for by improvement in diagnosis. Finally, he submits cancer statistics for the seven Australasian colonies, which show a marked increase during the last forty years. The present rates are, however, far below those occurring in Europe. These Australasian figures are not analyzed by age periods, the author dismissing this matter with a single table, showing that in New South Wales and Victoria the increase in the proportion of the population over 45 years has been but slight. This is not quite satisfactory, for, as Mr. King pointed out in discussion, a change from a population, 87.6 per cent of which was under 45, (Victoria, 1871), to one of which 83.2 per cent was under 45 (Victoria, 1891), would raise a corrected cancer rate of 467 per million to one of 562. In the discussion of Mr. Teece's paper, Dr. Newsholme furnished an interesting table of the deaths from cancer by affected parts in Ireland in 1887-89 and 1897-99, and in Brighton in 1889-91 and 1898-1900. While the Irish statistics show an increase from .43 per 1000 to .58, those for Brighton give rates of .86 and .83. This bears out Dr. Newsholme's observation, that in communities where medical attendance is especially skilled, the cancer rate is high and stationary, while in districts like Ireland and the Australasian colonies it is rising toward the true level, as diagnosis and certification improve. It is interesting to note, however, that the Irish statistics show marked increase in cancer of certain parts where the disease is not difficult of

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diagnosis. Thus among males, in the periods cited, deaths from cancer of the head, face, eye, orbit, nose and ear have increased from 215 to 260, — from cancer of the jaws from 93 to 146, — of the mouth, tongue and lips from 304 to 423, — and of the neck, throat, tonsils and larynx from 216 to 292. The question as to the reality of the increase of cancer can probably only be definitely settled by the lapse of time. If Dr. Newsholme is right, the conditions as to accurate diagnosis and thorough certification which obtain at Brighton will be shortly reached by other cities, and the apparent increase of cancer will then come to a standstill.

Some valuable cancer statistics are to be found in a paper by Dr. R. Laspeyres entitled *Ein Beitrag zur Krebsstatistik* in the *Centralblatt für allgemeine Gesundheitspflege*, vol. XX, 1901, p. 342. The author analyzes the figures for certain Prussian provinces for the period 1891-95. The death rates from cancer for the five decennial age periods between thirty and eighty are compared in great detail, and the relation between a high cancer rate and the concentration of population is clearly shown. For example, the following table may be cited: —

DEATHS FROM CANCER PER 10,000 LIVING AT THE CORRESPONDING AGE PERIOD.

Age Period.	30–40		40–50		50–60		60–70		70–80		30–80	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Prussia, as a whole...	1.53	2.96	6.85	9.40	18.72	19.31	33.29	28.86	32.15	29.15	4.66	5.38
All urban districts....	2.10	4.30	10.10	14.10	27.60	28.00	51.60	41.90	55.00	47.40	6.28	7.96
Large cities.....	2.50	3.90	12.30	18.30	34.30	36.50	68.00	53.00	81.00	67.00	6.33	9.79
Cities of medium size	2.40	4.80	8.90	16.10	32.00	30.90	61.00	49.60	66.00	57.00	6.37	8.32
Small cities.....	1.60	2.80	7.60	9.80	21.00	21.20	39.40	32.10	38.00	31.00	5.94	6.34
Rural districts.....	1.16	1.85	4.60	6.10	13.50	13.60	23.70	19.90	21.90	17.60	3.58	3.64

Arranged in another way, according to the density of population, the statistics exhibit the same relation, as follows:

Number of Districts.	Inhabitants per Square Kilometer.	Deaths from Cancer per 10,000 Population between 30 and 80.	
		Males.	Females.
10	14	14.1	13.3
14	26	17.1	17.0
10	80	20.1	19.4

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A consideration of the statistics for the Rhine province and Westphalia shows a similar phenomena:

Character of Districts.	Number of Districts.	Inhabitants per Square Kilometer.	Deaths from Cancer per 10,000 total population.
Purely Agrarian.....	38	74.6	3.1
Mainly "	23	106.0	3.5
Mixed Agrarian and Industrial...	12	172.0	3.7
Purely Industrial.....	26	416.0	3.8

All these facts correspond with Newsholme's theory that the apparent increase of cancer is due simply to improved diagnosis, as medical service must be at its best in the large centres. Finally, Dr. Laspeyres' figures show that in the districts considered the female death rate from cancer is higher than the male death rate only in the age period, 30-50, while after fifty years the conditions are reversed.

The *Thirty-second Annual Report of the State Board of Health of Massachusetts* for 1900 contains a valuable review of the "Statistics of Cancer in Massachusetts," by Dr. W. F. Whitney, which furnishes another support to the theory that the increase of that disease is only apparent. Dr. Whitney concludes that, "The assumed increase is probably due to better diagnosis and registration, and until the ratio of all the deaths from cancer, over thirty years to the total mortality of the same ages has reached 8 or 9 per cent, which is shown by autopsies to be the true ratio for cancer, it is not justifiable to speak of the increase as inherent in the disease itself." Tables are given of the population and of deaths from cancer and from all causes for each of the five-year periods from 1850 to 1895, classified by decennial age periods, and the ratios of cancer deaths to the population are calculated. The final result is summarized in the following table:

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INCREASE OF CANCER IN MASSACHUSETTS. RATIO OF PERCENTAGES OF 1895 TO THOSE OF 1870.

Ages	30-40		40-50		50-60		60-70		70-80		80-100	
Sex	M.	F.	M.	F.	M	F.	M.	F.	M.	F.	M.	F.
Pecentage of total mortality	2.01	1.44	1.82	1.59	1.49	1.63	1.66	1.48	1.43	1.63	1.61	1.35
Death rate	1.91	1.26	1.99	1.64	1.81	2.02	2.01	1.85	1.61	1.83	1.65	1.41

The same excess of female over male cancer deaths at the earlier age periods, which was shown in the German statistics above quoted, appears in Massachusetts, and it is further apparent that this excess at the earlier period is lessening yearly. This corresponds well with the fact that the forms of cancer principally prevalent among females at these age periods are easily diagnosable, so that a rise in the ratio of males to females was to be looked for. The final table given is as follows:

PROPORTION OF CANCER DEATH RATE, FEMALE TO MALE.

Age	30-40	40-50	50-60	60-70	70-80	80-100
1870	4.36	3.77	2.05	1.51	1.15	1.13
1895	2.92	3.27	2.23	1.40	1.31	0.98

Comparative tables for the six New England States, for Michigan, England and Wales and Austria are also given, showing the ratio of cancer to general mortality. The results extracted from the tables for the New England States (the age periods for the European States are different), are as follows:

PERCENTAGE OF CANCER DEATHS TO TOTAL MORTALITY, 1895.

States.	All Ages	Ages over 30	30-40	40-50	50-60	60-70	70-80	80-100
Maine	4.35	6.73	3.60	8.44	11.23	8.97	6.39	2.80
New Hampshire	3.80	6.01	3.27	7.86	9.02	7.77	5.60	2.67
Vermont	3.56	5.60	2.75	7.64	8.88	7.56	5.13	2.58
Massachusetts	3.49	6.58	3.10	7.54	10.37	8.86	5.64	2.72
Rhode Island	3.07	5.86	3.05	6.79	8.10	7.20	5.25	2.86
Connecticut	3.14	5.50	2.66	7.45	8.31	7.36	4.32	2.46

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Of the regular statistical material in the Massachusetts report for 1900, may be mentioned a diagram of the reported mortality from diphtheria and croup, and from scarlet fever by weeks for a period of 18 years. The autumnal rise, beginning in September, just after the opening of the school term, is shown with great distinctness in the case of diphtheria and croup. The death rate from consumption in 1900 fell to 18.5, the lowest figure ever recorded and the culmination of an almost steady fall from 42.7 in 1853. In absolute number of deaths this disease for the first time takes the second place, being exceeded by pneumonia. The changes in the typhoid death rate since 1871 are equally encouraging:

TYPHOID FEVER DEATH RATE PER 10,000 POPULATION.

	1871-75	1876-80	1881-85	1886-90	1891-95	1896-1900
Mean for the Cities	8.2	4.2	5.1	4.6	3.4	2.6
Mean for the State	8.2	4.5	5.0	4.1	3.2	2.4

At the end of the report are the usual statistics as to the fatality and seasonal prevalence of the infectious diseases, which are always of interest. The fatality rates given are as follows: Diphtheria, and croup, 10.2; scarlet fever, 5.3; typhoid fever, 16.5; measles, 1.7. It may be noted that the diphtheria rate has fallen to 10.2, from 11.6, the lowest previous figure, while the fatality rates of scarlet fever and measles have increased, and the reported cases of diphtheria have nearly doubled as compared with 1899. In the pre-antitoxin period, 1891-94, the diphtheria fatality ranged between 23.5 and 31.7. In 1895 it was 18.9, and the fall has been uninterrupted since.

A paper by Dr. W. H. Symons, entitled "Statistics Concerning Consumption and Other Preventable Diseases," in *Public Health* for June, 1901, reviews some of the registration figures for England and Wales and for three English counties. The author points out that while the total number of men killed in action or dying in the service of the army during the seven years' war with France, 1793 to 1800, was 48,971, and while the total reported loss by wounds

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and disease in the South African war up to the end of 1900 was 12,158, consumption killed 60,139 persons in England and Wales in the year 1898 alone. The distribution by age periods makes the serious nature of the disease still more obvious. While the percentage of deaths from tuberculosis to total deaths in 1889-90 was only 12.7 for all ages, it was 42.8 between 15 and 25, and 40.2 between 25 and 35. It is, of course, true, that the death rate is decreasing, but it is interesting to note that the decrease is mainly in tuberculosis of the lungs among adults.

REDUCTION PER CENT IN MORTALITY FROM TUBERCULOSIS, 1861-70 AND 1891-97.

	All Forms.		Lungs.		Bowels.		Brain	
	M.	F.	M.	F.	M.	F.	M.	F.
All Ages	31	42	35	49	23	24	39	31
Children under 1 Year.	15	15	55	58	4*	1	42	40

*Increase.

These statistics, exhibiting a stationary rate of tubercular disease of the intestines among children, are used by Dr. A. Newsholme in an article on "Tuberculosis in Relation to Milk Supply," in the same periodical, as an argument in favor of the belief that cow's milk is an important factor in the spread of intestinal tuberculosis. He points out in this connection the striking fact that, while only 3.6 per cent of the deaths from consumption of the lungs occur in children under 5, 78.2 per cent of the deaths from consumption of the bowels occur at that age-period. These English statistics are certainly striking; but the maintenance of a high death rate from tabes mesenterica in children is not a constant factor in other countries.

The *Lancet*, for August 10, 1901, contains a paper on "The Mortality from Phthisis and from other Tuberculous Diseases," by T. E. Hayward, in which a calculation is made of the increased expectation of life which would ensue if the diseases named were eliminated from the causes of death. Life tables are calculated on this basis for the periods 1851-60 and 1881-90.

It appears that the expectation of life at birth during the second period would have been increased a little over two and a half years

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if there had been no deaths from phthisis and over 3.7 years if there had been no deaths from any tuberculous disease. Between the ages of 2 and 10 the increase by the elimination of phthisis would have been over 3 years.

TOTAL LIFE CAPITAL IN YEARS IN ENGLAND AND WALES AT THE MIDDLE OF THE YEAR, 1891.

		Increase due to Elimination of	
	Total Life Capital.	Phthisis.	All other Tubercular Diseases.
Males	509,090,868	31,333,250	2,918,312
Female	561,118,572	28,344,687	2,946,730

A review of "The Outbreak of Small-Pox in London" by Dr. William R. Smith in the *Journal of State Medicine*, for November, 1901, quotes the statistics as to small-pox cases admitted to the hospitals of the Metropolitan Asylums Board from 1890 to 1900. During this period there were 1247 admissions of this disease and 176 deaths; only 177 of the cases and two of the deaths were among children exhibiting evidence of proper vaccination. The proportion of vaccinated children in London is reckoned by Dr. Smith at 70 per cent, so that the reduction of mortality is very striking. The difference in fatality rates between 16.3 for the unvaccinated and 1.1 for the vaccinated, is, at any rate, convincing.

C.-E. A. WINSLOW.

COST OF HOME-COOKED AND PURCHASED FOOD.

In 1898 the Committee on Domestic Service of the Boston Branch of the Association of Collegiate Alumnæ undertook a consideration of the possibility of having more housework done outside the home. Investigations were begun in laundry work, cleaning, and foods, but the Committee soon found it wiser to confine their work to but one of these subjects at a time, and that of foods was chosen as the most important. At first the attempt was made to get at the desired in-

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formation through a number of careful experimenters in their own homes, but again it was found that accurate results could only be obtained by detailing to the work one person who should give definite time to experiments in a laboratory. Accordingly, Miss Gertrude Bigelow, a graduate of Wellesley in 1893, carried on the necessary investigations during the year 1900-1901, at the School of Housekeeping in Boston.

Miss Bigelow undertook to determine for home-cooked foods (1) the cost of materials, (2) the cost of labor, (3) the cost of fuel, (4) the cost of wear and tear on equipment and of waste, and (5) the quality as compared with ready-cooked food. The cost of material could be determined with comparative accuracy, but in the measurement of the other four factors many practical difficulties were encountered. For instance, in preparing foods at home, the housekeeper cooks several things at once, so it is very difficult to determine just how much labor, fuel, and wear and tear on utensils is represented in the preparation of each. Again, we have no standard for the quality of food because tastes differ so widely.

For the general computations in these experiments the cost per hour for labor was taken as eight and a half cents, this figure having been estimated from the determinations of the average wage for houseworkers and cooks, made by the Women's Educational and Industrial Union, and by Professor Lucy M. Salmon. In calculating the cost of fuel, experiments were made with coal, oil, and gas stoves. The same weight of food was cooked in each instance, and the time required for cooking with each fuel recorded. A great variety of foods was used in this testing of fuels, six different and complete menus being prepared on successive days, and the cost of fuel for each dish calculated. It was found that coal, at least for this section of the country, is the cheapest of the three fuels, and gas the most expensive but the most convenient and economical from the standpoint of labor. It is not safe, however, to make a broad generalization from this statement, since the cost per hour will always vary with the stove. The items of wear and tear and of waste had to be discarded from the investigation because no house manager could be found who could give an accurate statement of their cost, a circumstance which throws much light on the present disorganized condition of house-management. The standard for

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quality of food, arbitrarily adopted in this investigation, was the combined judgment of fourteen students at the School of Housekeeping.

Having determined the cost of labor and fuel approximately, Miss Bigelow next made a comparison of home-cooked and ready-cooked bread and meats. The actual cost of home-made bread does not differ materially from that of baker's bread, but in most cases the items of fuel and labor may be discarded, for the fuel would be burned anyway, and the houseworker is hired by the week, so that the expense for labor is the same whether she makes bread or not. Under these conditions the cost of home-made bread would be only that for materials, and would be much less than for baker's bread. Furthermore, there is a very considerable difference in the quality of the two, and it is an open question whether home-made bread will not go farther than the same weight of baker's bread. Similar comparisons were made between home-cooked meats and those cooked outside the home, and again it was found that the home-cooked food was somewhat cheaper. Estimates were also made of the cost of the entire food consumed by a family, first, when the foods were all prepared in the home, and second, when it was delivered ready for the table. One series of experiments showed that the cost per person for food purchased ready-cooked was about 55 per cent more than that for home-cooked food, and a second series showed it to be about 30 per cent more where the first gave 55. The results of these experiments were not expected to be quantitatively accurate. The work was undertaken merely to answer practically the question as to whether it would be possible to purchase ready-cooked all the food required by a family, and what its relative cost would be as compared with the home-cooked food.

The above investigations prove very conclusively that the cost of food prepared outside the home is to-day greater than that of the same food home-cooked. Nevertheless the introduction of ready-cooked foods into a household can be shown to save ultimately labor, fuel, space, waste of food and equipment of the kitchen. The question arises as to whether this saving will not more than counterbalance the extra expense. Furthermore, would it not be possible for the housekeeper who now devotes herself to household duties, to employ her

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time in some more remunerative occupation, and thus add to the family income more than the extra cost of ready-cooked foods substracts? These are questions that the future alone can answer. Meantime, it cannot be denied that there is today a tendency to have more and more work done outside the home, although it is a disputed question as to how far this tendency will be carried. One caterer reports that his sale of ready-cooked foods is five times greater than two years ago, and everywhere the sale of these foods has been so rapidly growing that a still greater increase may reasonably be expected in the near future. With an increased demand will come, in all probability, a decrease in price, an improvement in quality, and in means for delivering the food hot and ready to serve.

The work of the Committee on Domestic Service, whatever else may have been its result, is of great value, since it begins the investigation on a scientific basis of existing conditions in house-management. Although the inquiry has been limited, it has shown that the average housekeeper, practical and experienced though she may be, can give no accurate estimate of fuel, labor, living expenses of the employé, wear and tear of equipment, etc., and until these items and the numerous other family expenditures are definitely recognized and determined, the economic and scientific management of the household cannot be hoped for.

AVA M. STODDARD.

A STUDY OF MUNICIPAL GROWTH.

The Population and Finances of Boston. A Study of Municipal Growth. By Frederic H. Fay, M.S., Boston, 1901. 8vo, 33 pp., with 3 charts.

In this volume the author has attempted, by a careful survey of the past, to forecast the future growth of Boston in population, and to estimate the future increase in the valuation, income, expenditure and net debt of the city. It is assumed that, unless conditions radically change, the future growth along all these lines will continue about the same as in the past. The laws of growth, according to which the population has increased and the finances have developed, have been determined by an application of the method of least

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squares to the data available in the past experience of Boston. By this method formulæ have been derived having the general form

$$X = A + Bt + Ct^2$$

in which X is the quantity sought, t is the time in years from 1900 (being negative prior, and positive, subsequent to that year) and A, B and C are constants derived mathematically from the observed data. Generally speaking, the growth of the population has been continuous from census to census from 1790 to 1900, and the finance statistics, too, have mounted upward, in such manner that, if plotted, the lines graphically representing the increase show an upward sweep.

Mr. Fay has shown care and discrimination in the use of his data. He has found the equation of the curves most closely fitting his various series of facts, and it is not unreasonable to suppose that the curves as extended to represent the predicted future growth will approach as closely the data actually recorded, in the near future, at least, as any that can be drawn on the basis of past experience.

To most statisticians the method of least squares must always form an almost insuperable obstacle. It is employed by astronomers and civil and mechanical engineers, but for the most part to correct several observations of the same fact when those observations show discrepancies. It is also used to a limited extent in such problems as the author here has before him. Other simpler methods may, however, be employed which are quite as satisfactory. The whole subject of the application of the theory of probability to statistics is admirably discussed in Part II of Bowley's *Elements of Statistics*. In the preface to his book (p. vii), writing of the method of least squares, Mr. Bowley remarks that "the phrase, useful in some connections, seems to make the application of the Law of Error to statistics unnecessarily complex."

This criticism, if so it may be called, does not in the least detract from the excellent work presented by Mr. Fay in his study of the municipal growth of Boston. The problems assigned him have been worked out in such manner and the solutions presented in such form that if the predictions prove to be wide of the mark it will not be

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the fault of the prophet. The complexity of the determining conditions in such data as are here discussed make distant forecasts of even approximate accuracy well-nigh impossible.

F. S. CRUM.

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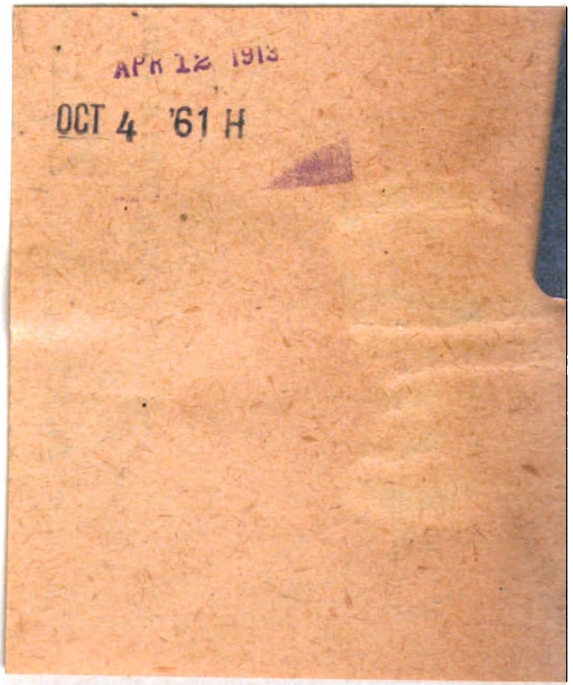
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